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ABSTRACT

This book contains a task inventory, a task analysis of 150 tasks from that inventory, and a tool list for performance-based welding courses in the state of Indiana. The task inventory and tool list reflect 28 job titles found in Indiana. In the first part of the guide, tasks are listed by these domains: carbon-arc, electron beam, G.M.A.W., gas tungsten arc weld, inspection, layout, oxyfuel, sub-arc, and S.M.A.W. Following are five sections of task analysis guides written by five teachers in Indiana secondary or postsecondary vocational schools or colleges. Each guide contains a task statement, task performance cues, task performance procedures, task elements, and lists of tools, references, and work aids. Appendixes to the guide are a tool list and a welding project task list. (KC)

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PERFORMANCE BASED
VOCATIONAL EDUCATION

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TOOL
and
TASK ANALYSIS GUIDE
for
VOCATIONAL WELDING
(150 Tasks)

CE038452

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TOOL AND TASK ANALYSIS

FOR

VOCATIONAL WELDING

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Section 3 .Rusty Lynde

Section 4 .Dan Sterrett

Section 5 .Jerry Yarger

Appendix A . . . . .Tool List

Appendix B .Welding Project Task List

For the Reader

This project was funded by the State Board of Vocational and Technical Education. The intent of this project was to establish a Task Inventory, Task Analysis of (150) tasks from that inventory, and a Tool list for Welding here in the state of Indiana. The task inventory and tool list reflect twenty-eight (28) job titles found in Indiana.

Definition of Terms

Job Title. This term means the sum of all the tasks performed by the job incumbent as identified through a statistically treated task inventory survey.

Task. A task is an activity comprised of certain stimulus and response element, the results which are either directly observable or indirectly inferrable. (West, 1976).

Task Analysis. A process of identifying a limited range of interrelated cognitive and psychomotor elements which comprise a task and which may be generalizable to other tasks within a duty domain. The analytical process is designed to derive a highly definitive list of task-specifics and generalizable capabilities and possible learning sequences. (West, 76).

After the task domain was established, each task was analyzed. A person knowledgeable in the performance of each task was interviewed and each step recorded. The steps and decision points are called task elements. The results supply an acceptable way to perform each task and a document from which learning content may be extracted.

About the Committee
(Writing Team)

The writing team was designed to reflect secondary and post secondary schools here in Indiana. It was the intent of the state curriculum personnel to combine the expertise of both levels of the welding instructors to insure a valid opinion from both levels of education.

The project director screened many welding instructors for this project. It is the project director's belief that the personnel listed on the following page are highly successful, competent and the more involved weld-instructors in the state of Indiana.

WELDING COMMITTEE

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WELDING COMMITTEE

Mr. Archie Hook
Anaconda Wire & Cable Company
Anderson, Indiana
35 years service (retired in 1979)
20 years training supervisor for Anaconda

Mr. William Ginder
Anaconda Wire & Cable Company
Anderson, Indiana
22 years service with Anaconda
Presently self employed and contracting with the City of Anderson.

Mr. Van Campbell
Columbus High School
Columbus, Indiana
Pullman Standard (5 years)
Presently teaching at Columbus

TASKS LISTED BY DOMAINS

CARBON-ARC

Domain: Carbon Arc, Carbon Steel

Carbon Arc Air-and backgouge-on Carbon Steel.
Arc Air-edges for welding on Carbon Steel,
Carbon Arc Air-cut metal to specifications on Carbon Steel.
Cut holes with Arc Air Torch Carbon Steel.
Removing fatigued metal with the Air Carbon Arc process.

Domain: Carbon Arc, Copper Allow

Carbon Arc Air-cut metals to specifications on Copper Alloy.
Carbon Arc Air-backgouge on Copper Alloys.
Carbon Arc Air-edges for welding on Copper Alloy.

Domain: Carbon Arc, Cast Alloy

Carbon Arc Air-remove excessive Cast Alloy.
Carbon Arc Air-remove excessive Cast Steel.

Domain: Carbon Arc, Cast Iron

Carbon Arc Air-remove excessive Cast Iron,
Carbon Arc-prepare edges for welding on Cast Iron.
Carbon Arc Air-cut metal to specifications on Cast Iron.
Carbon Arc Air-and backgouge-on Cast Iron.

Domain: Carbon Arc, White Metal

Carbon Arc Air-remove excessive White Metals.
Carbon Arc Air-backgouge-on White Metals.
Set up Carbon Arc Air-cut metals to specifications on White Metals.
Carbon Arc Air-edges for welding on White Metals,

Domain: Carbon Arc, Alloy Steel

Carbon Arc Air-backgouge-on Alloy Steel.
Arc Air-prepare edges for welding on Alloy Steel.
Carbon Arc Air-cut metal to specifications on Alloy Steel.

ELECTRON BEAM

Domain: EBW Manganese

EBW Lap Joint Manganese Steel
EBW Tee Joint Manganese Steel
EBW Butt Joint Manganese Steel

Domain: EBW Nickel

EBW Lap Joint Nickel
EBW Tee Joint Nickel
EBW Butt Joint Nickel

Domain: EBW Aluminum

EBW Lap Joint Aluminum
EBW Tee Joint Aluminum
EBW Butt Joint Aluminum

Domain: EBW Stainless Steel

EBW Lap Joint Stainless Steel
EBW Tee Joint Stainless Steel
EBW Butt Joint Stainless Steel

Domain: EBW Copper

EBW Lap Joint Copper
EBW Tee Joint Copper
EBW Butt Joint Copper

Domain: Checks Prior to Operation and After Operation

Make Parameter Report
Sample Weld Parts for Weld Depth
Heat Treat Parts with EB Machine
Stress Relieve Parts with EB Machine
Make EB Machine Maintenance Checks

Domain: EBW Mild Steel

EBW Lap Joint Mild Steel
EBW Tee Joint Mild Steel
EBW Butt Joint Mild Steel

G.M.A.W.

Domain: G.M.A.W. Semi-automatic Hard Surfacing

Hard surface on cast iron/G.M.A.W. semi-automatic
Build-up worn parts to size before applying hard surface
material using G.M.A.W. semi-automatic.
Build worn surface with G.M.A.W./semi-automatic on lopper
and its alloys.
Build surface of alloy steel with the G.M.A.W. process.
Semi-automatic
Hardface alloy steel with the G.M.A.W. process. Semi-
automatic
Building worn surfaces on aluminun with G.M.A.W. equipment.
Semi-automatic
Hard surface on steel/G.M.A.W. Semi-automatic

Domain: G.M.A.W. Surfacing Aluminum Alloys

G.M.A.W. surfacing aluminum alloys. Flat position
G.M.A.W. surfacing cored wire nickel alloys
G.M.A.W. surfacing cored wire ss
Hardface edges on tool steel with the G.M.A.W. process.

Domain: G.M.A.W. Automatic Hard Surfacing

Hardsurface on cast iron G.M.A.W. Automatic equipment
Build-up worn parts to size before applying hard surfacing
material, using G.M.A.W. Automatic
Hardsurface on steel/ G.M.A.W. Automatic
Build worn surface of alloy steel with G.M.A.W. Automatic
process.
Build worn surface with G.M.A.W./Automatic on lopper and its
alloys
Build worn surface on aluminum alloys with G.M.A.W. Automatic.

Domain: G.M.A.W. Stainless Steel

Weld tee joint on stainless steel with G.M.A.W.
Weld tee joint on stainless steel with G.M.A.W.
Flux core
Weld edge joint on stainless steel with G.M.A.W.
Weld edge joint on stainless steel with G.M.A.W.
Flux core
Weld corner joint on stainless steel with G.M.A.W.
Weld corner joint on stainless steel with G.M.A.W.
Flux core
Weld butt joint on stainless steel with G.M.A.W.
Weld butt joint on stainless steel with G.M.A.W.
Flux core
Weld lap joint on stainless steel with G.M.A.W.
Weld lap joint on stainless steel with G.M.A.W.
Flux core
G.M.A.W. plug holes stainless steel

Domain: G.M.A.W. Aluminum

Weld tee joint on aluminum with G.M.A.W.
Weld edge joint on aluminum with G.M.A.W.
Weld corner joint on aluminum with G.M.A.W.
Weld butt joint on aluminum with G.M.A.W.
Weld lap joint on aluminum with G.M.A.W.
G.M.A.W. plug holes aluminum

Domain: G.M.A.W. Mild Steel

Weld tee joint on mild steel with G.M.A.W.
Flux core mild steel tee joint
Weld edge joint on mild steel with G.M.A.W.
Weld edge joint on mild steel with G.M.A.W.
Flux core
Weld corner joint on mild steel with G.M.A.W.
Flux core mild steel corner joint
Weld butt joint on mild steel with G.M.A.W.
Weld butt joint on mild steel with G M.A.W.
Flux core
Weld lap joint on mild steel with G.M.A.W.
Flux core mild steel lap joint
G.M.A.W. plug holes mild steel

Domain: G.M.A.W. Copper

G.M.A.W. copper tee joint
G.M.A.W. edge joint copper
G.M.A.W. copper corner joint
G.M.A.W. copper butt joint
G.M.A.W. copper lapp joint

Domain: G.M.A.W. Galvanized

G.M.A.W. galvanized carbon steel tee joint
G.M.A.W. sileron bronze galvanized tee joint
G.M.A.W. edge joint galvanized
G.M.A.W. silicon bronze galvanized edge joint
G.M.A.W. galvanized carbon steel corner joint
G.M.A.W. sileron bronze galvanized corner joint
G.M.A.W. galvanized carbon steel butt joint
G.M.A.W. sileron bronze galvanized butt joint
G.M.A.W. galvanized carbon steel lapp joint
G.M.A.W. sileron bronze galvanized lapp joint

Domain: G.M.A.W. Cast Iron

G.M.A.W. tee joint cast iron
G.M.A.W. edge joint cast iron
G.M.A.W. corner joint cast iron
G.M.A.W. butt joint cast iron
G.M.A.W. lap joint cast iron

Domain: G.M.A.W. Nickel Alloys

G.M.A.W. tee joint cored wire nickel alloys
G.M.A.W. edge joint cored wire nickel alloys
G.M.A.W. butt joint cored wire nickel alloys
G.M.A.W. lap joint cored wire nickel alloys
G.M.A.W. corner joint cored wire nickel alloys

GAS TUNGSTEN ARC WELD

G.T.A.W. (T.I.G.) "Heliarc" Tool Steel

G.T.A.W. Tool steel corner joint.
G.T.A.W. Tool steel tee joint.
G.T.A.W. Tool steel lapp joint.
G.T.A.W. Tool steel butt joint.
Hard face edges on tool steel with the G.T.A.W. process.

G.T.A.W. (T.I.G.) "Heliarc" Automatic

Auto G.T.A.W. edge joint stainless steel horizontal postition.
Auto G.T.A.W. spot weld stainless steel horizontal position.
Auto G.T.A.W. corner joint stainless steel flat position.
Auto G.T.A.W. butt joint stainless steel flat position.
Auto G.T.A.W. lap joint stainless steel flat position.

G.T.A.W. (T.I.G.) "Heliarc" Copper Alloys Dissimilar

G.T.A.W. Silicon Bronze/Copper Alloys butt joint.
G.T.A.W. Silicon Bronze/Copper Alloys lapp joint.
G.T.A.W. Silicon Bronze/Copper Alloys corner joint.
G.T.A.W. Silicon Bronze/Copper Alloys tee joint.
G.T.A.W. Silicon Bronze/Copper to Cast Iron.
G.T.A.W. Silicon Bronze/Stainless to Copper.

G.T.A.W. (T.I.G.) Heliarc Automatic Mild Steel

Auto G.T.A.W. Lapp joint Mild Steel Flat position.
Auto G.T.A.W. T-joint Mild Steel Flat position.
Auto G.T.A.W. Spot Weld Mild Steel flat position.
Auto G.T.A.W. Edge joint Mild Steel flat position.

G.T.A.W. (T.I.G.) "Heliarc" Automatic Titanium

Auto G.T.A.W. Corner joint Titanium horizontal position.
Auto G.T.A.W. Spot weld Titanium.
Auto G.T.A.W. Edge joint Titanium.
Auto G.T.A.W. Butt joint Titanium.
Auto G.T.A.W. Lapp joint Titanium.

G.T.A.W. (T.I.G.) "Heliarc" Manual Alloy Steel-Stainless

G.T.A.W. Butt joint stainless steel.
G.T.A.W. Tee joint stainless steel.
G.T.A.W. Corner joint stainless steel.
G.T.A.W. Lapp joint stainless steel.

G.T.A.W. (TIG) "Heliarc" Manual Alloy Steel-Stainless (Continued)

Pierce holes with stainless G.T.A.W. equipment.
Hard face on stainless steel with G.T.A.W. process.
Build surface of alloy steel to size with the G.T.A.W. process.
Hard face alloy steel with the G.T.A.W. process.

G.T.A.W. (T.I.G.) "Heliarc" Aluminum

G.T.A.W. Butt joint Aluminum.
Build worn surfaces on Aluminum with the G.T.A.W. process.
Auto G.T.A.W. corner joint Aluminum flat position.
Auto G.T.A.W. spot weld Aluminum flat position.
G.T.A.W. edge joint Aluminum.
G.T.A.W. corner joint Aluminum.
G.T.A.W. lapp joint Aluminum.
G.T.A.W. tee joint Aluminum.

G.T.A.W. (T.I.G.) "Heliarc" Cast Iron

G.T.A.W. Tee joint Cast Iron.
G.T.A.W. Edge joint Cast Iron
G.T.A.W. Corner joint Cast Iron
G.T.A.W. Lapp joint Cast Iron
G.T.A.W. Butt joint Cast Iron
Hardface on Cast Iron with the G.T.A.W. process.

G.T.A.W. (T.I.G.) "Heliarc" Automatic Magnesium

Auto G.T.A.W. Tee joint Magnesium.
Auto G.T.A.W. Edge joint Magnesium.
Auto G.T.A.W. Corner joint Magnesium.
Auto G.T.A.W. Lapp joint Magnesium.

G.T.A.W. (T.I.G) "Heliarc" Automatic Copper

Auto G.T.A.W. Spot Weld Copper flat position.
Auto G.T.A.W. Corner joint Copper.
Auto G.T.A.W. Butt joint Copper.
Auto G.T.A.W. Edge joint Copper.
Auto G.T.A.W. Lapp joint Copper.

G.T.A.W. (T.I.G.) "Heliarc" Manual Copper

G.T.A.W. Copper tie joint.
G.T.A.W. Copper corner joint.
G.T.A.W. Copper Lapp joint.
G.T.A.W. Copper Butt joint.
G.T.A.W. Edge Joint copper
Hardface on Copper and its alloys with the G.T.A.W. process.

G.T.A.W. (T.I.G.) "Heliarc" Manual Magnesium

G.T.A.W. Magnesium butt joint.
G.T.A.W. Magnesium Lapp joint.
G.T.A.W. Magnesium tee joint.
G.T.A.W. Magnesium corner joint.

G.T.A.W. (T.I.G.) "Heliarc" Automatic Inconel

Auto G.T.A.W. Spotweld Inconel.
Auto G.T.A.W. Tee joint Inconel.
Auto G.T.A.W. Butt joint Inconel.
Auto G.T.A.W. Lapp joint Inconel.
Auto G.T.A.W. Edge joint Inconel.
Auto G.T.A.W. Corner joint Inconel.

G.T.A.W. (T.I.G.) "Heliarc" Mild Steel

G.T.A.W. Edge joint mild steel.
G.T.A.W. Carbon Steel butt joint.
G.T.A.W. Carbon Steel lapp joint.
G.T.A.W. Carbon Steel tee joint.
G.T.A.W. Carbon Steel corner joint.
Hardface on Carbon steel with G.T.A.W. process.

INSPECTION

Domain: Records and Paperwork

Maintain records.
Check chemical composition as shown on mill report.
Prepare reports.
Interpret welding drawings.
Check purchase order to check specification with print.

Domain: Inspection Prior to Welding

Check welding equipment to be used.
Check joint fit up.
Check weld joint prepration.
Verify welding procedure.
Verify the qualifications of the welder.
Check and identify materials.

Domain: Inspection after Welding

Evaluate the test results.
Select production test samples.
Check weldments for cracks using Magna-Flux equipment.
Inspect welds with dye penetrants.

LAYOUT

Domain: Layout

Fabricate part to blue print specifications.
Mark metal where hole is to be drilled.
Mark where metal is to be bent.
Mark where metal is to be cut.
Fabricate fixture to hold part.
Mark where metal parts are to join.
Mark metal where slot is to be machined.
Inspect pre-made part to conform to specification.
Inventory pre-made part.
Inspect raw material for quality.
Cut metal with shear.
Cut metal with Band saw.
Form metal with brake press.
Punch metal with punch press.
Drill metal with drill press.

OXYFUEL

Oxy-Fuel Hardfacing Spray Process

Hard face alloy steel with oxy-acetylene eutallory spray process.
Hard face areas on cast iron with the Eutallory spray process.
Build worn areas on cast iron with the Eutalloy spray process.
Build worn surfaces with the Eutalloy spray process on copper and its alloys.
Hard face surface areas with the Eutallory spray process on steel.
Build worn parts using the Eutallory spray torch on steels.

Oxy-Fuel Hard Surfacing

Build up edges on tool steel with the oxy-acetylene process.
Oxy/acetylene hard facing on copper and copper alloys.
Hard face alloy steel with the oxy-acetylene process.
Build surface of alloy steel to size with the oxy-acetylene process.
Oxy-acetylene hard facing on cast iron.

Oxy-Fuel Weld Copper alloys

Fusion weld butt joint on copper alloys.
Fusion weld lapp joint on copper alloys.
Fusion weld tee joint on copper alloys.
Fusion weld corner joint on copper alloys.
Fusion weld edge joint on copper alloys.

Braze Dissimilar Metal

Braze copper to steel tee joint tubing brazer.
Braze copper to steel lap joint tubing brazer.
Braze steel to brss lap joint tubing brazer.
Braze steel to brass butt joint tubing brazer.
Braze copper to steel butt joint.

Braze Alloy

Braze butt joint on alloy steel.
Copper alloy braze edge joint on alloy steel.
Copper alloy braze corner joint on alloy steel.
Copper alloy braze tee-joint on alloy steel.
Braze lapp joint on alloy steel.
Copper alloy braze butt joint on alloy steel.

Fusion Carbon Steel

Fusion weld butt joint on carbon steel.
Fusion weld lapp joint on carbon steel.
Fusion weld tee joint on carbon steel.
Fusion weld corner joint on carbon steel.
Fusion weld edge joint on carbon steel.

Oxyfuel cutting

Track burner starts cutting carbon steel.
Straight cuts on carbon steel plate to size to specifications.
Cut metal with radio-graph oxy-fuel cutter.
Cut metal with oxy-fuel hand torch cutter.
Oxy-fuel /track cut sheet stocks straight line.
Remove distortion in weldment using heat sheet metal welder.
Forge metals to shape using heat sheet metal welder.
Cut cast iron with oxy-fuel equipment.
Oxy-fuel cut scrap structural steel to size at least six tons a day.
Oxy-fuel cut worn or damaged pieces from structural members.
Set-up/cut and trim structural parts to size with hand held oxy-fuel torch.
Scarf with hand-held torch.

Oxy-fuel Braze Copper

Oxy-fuel brazing copper corner joint sheet metal welder.
Oxy-fuel copper tee joint sheet metal welder.
Oxy-fuel brazing copper lapp joint sheet metal welder.
Oxy-fuel copper butt joint sheet metal welder.

Oxy-fuel braze Cast Iron

Copper alloy braze edge joint on cast iron.
Copper alloy braze corner joint on cast iron.
Copper alloy braze tee joint on cast iron.
Copper alloy braze lapp joint on cast iron.
Copper alloy braze butt joint on cast iron.

Oxy-fuel Braze Carbon Steel

Copper alloy braze edge joint on carbon steel.
Copper alloy braze corner joint on carbon steel.
Copper alloy braze tee joint on carbon steel.
Braze lapp joint on carbon steel.
Copper alloy braze butt joint on carbon steel.

Solder Copper

Solder Copper lapp joint sheet metal welder.
Solder Copper corner joint sheet metal welder.
Solder Copper tee joint sheet metal welder.

Solder Galvanized

Solder galvanized sheet tee joint.
Solder galvanized sheet lapp joint.
Solder galvanized sheet corner joint.

Oxy-Fuel Fusion Alloy

Fusion weld butt joint on alloy steels.
Fusion weld lapp joint on alloy steels.
Fusion weld tee joint on alloy steels.
Fusion weld corner joint on alloy steels.
Fusion weld edge joint on alloy steels.

Silver Braze Copper

Silver braze copper corner joint.
Silver braze copper tee joint.
Silver braze copper lapp joint.
Silver braze copper butt joint.

Oxy-fuel Lead

Weld butt joint on lead with oxy-fuel welder.
Weld tee joint on lead with oxy-fuel welder.

Oxy-fuel Aluminum

Oxy-fuel weld lap joint aluminum.
Oxy-fuel weld corner joint aluminum.
Oxy-fuel weld edge joint aluminum.
Oxy-fuel braze tee joint aluminum.
Oxy-fuel braze butt joint aluminum.
Oxy-fuel braze corner joint aluminum.

Oxy-Fuel Weld White Metals

Fusion weld butt joint on white metals.
Fusion weld lapp joint on white metals.
Fusion weld tee joint on white metals.
Fusion weld corner joint on white metals.
Fusion weld edge joint on white metals.

Oxy-Fuel Weld Cast Iron

Weld butt joint on cast iron with oxy-fuel welder.
Weld lap joint on cast iron with oxy-fuel welder.
Fusion Weld tee joint on cast iron.
Weld corner joint on cast iron with oxy-fuel welder.
Weld edge joint on cast iron with oxy-fuel welder.

Oxy-Fuel Braze Copper

Copper Alloy Braze edge joint on copper alloy.
Copper Alloy Braze corner joint on copper alloy.
Braze tee joint on copper alloy.
Copper alloy braze lapp joint on copper alloy.
Copper alloy braze butt joint on copper alloy.

Oxy-fuel braze Galvanized sheet steel

Oxy-fuel galvanized sheet steel corner joints.
Oxy-fuel galvanized sheet steel tee joint.
Oxy-fuel galvanized steel lapp joint.
Oxy-fuel galvanized sheet steel butt joint.

Oxy-fuel silver braze tungsten carbide

Silver braze lapp joint on Tungsten carbide.
Silver braze corner joint on Tungsten carbide.
Silver braze edge joint on Tungsten carbide.
Silver braze tee joint on Tungsten carbide.
Silver braze lapp joint on Tungsten carbide.
Silver braze butt joint on Tungsten carbide.

Oxy-fuel Braze Carbon Steel

Oxy-fuel brazing carbon steel corner joint.
Braze tee joint on carbon steel.
Braze butt joint on carbon steel.

SUB-ARC

Domain: Sub-Arc

Welding Automatic Steel Alloy
Weld butt joint on alloy metal with Sub-Arc Auto
Weld lap joint on alloy metal with Sub-Arc Auto
Weld tee joint on alloy metal with Sub-Arc Auto
Weld corner joint on alloy metal with Sub-Arc Auto

Domain: Submerged Arc Welding Steel Semi-Automatic

Hard facing steel with G.M.A.W. Submerged Arc Semi-Automatic equipment.
Build up worn parts to size before applying hardsurfacing metal with G.M.A.W. sub-merged arc.

Domain: Sub-Arc Welding Automatic steel

Weld butt joint on mild steel with Sub-arc. Auto
Weld edge joint on mild steel with Sub-arc. Auto
Weld corner joint on mild steel with Sub-arc. Auto
Weld lap joint on mild steel with Sub-arc. Auto
Weld tee joint on mild steel with Sub-arc. Auto

Domain: Sub-merged arc automatic cast iron

Hardfacing on cast iron with G.M.A.W. submerged arc. Auto.
Hardface alloy steel with automatic G.M.A.W. submerged Arc process.
Hardfacing areas on steel with G.M.A.W. automatic submerged arc.
Building up worn areas on cast iron with G.M.A.W. submerged arc. Auto.
Build surface of alloy steel with the G.M.A.W. submerged arc process. Auto

S. M. A. W.

Domain: S.M.A.W. Aluminum

Building worn surfaces with S.M.A.W./on Aluminum
S.M.A.W. Aluminum Alloys Butt Joint
S.M.A.W. Aluminum Alloys Lapp Joint
S.M.A.W. Edge Joint Aluminum
S.M.A.W. Aluminum Alloys Tee Joint
S.M.A.W. Aluminum Alloys Corner Joint

Domain: S.M.A.W. Silicon Bronze, Carbon Arc, Carbon Steel

S.M.A.W. Silicon Bronze Carbon Arc, Carbon Steel Tee Joint
S.M.A.W. Silicon Bronze Carbon Arc, Carbon Steel Corner Joint
S.M.A.W. Silicon Bronze Carbon Arc, Carbon Steel Lap Joint
S.M.A.W. Silicon Bronze Carbon Arc, Carbon Steel Butt Joint

Domain: S.M.A.W. Alloy Steels

Hard Face Alloy Steel with the S.M.A.W. Process
Build surface of Alloy Steel to Size with S.M.A.W.
S.M.A.W. Stainless Steel Lap Joint
S.M.A.W. Stainless Steel Butt Joints
S.M.A.W. Edge Joint Stainless Steel
S.M.A.W. Tee Joint Stainless Steel
S.M.A.W. Stainless Steel Corner Joint

Domain: S.M.A.W. Silicon Bronze Carbon Arc, Galvanized Steel

S.M.A.W. Silicon Bronze, Carbon Arc, Galvanized Tee Joint
S.M.A.W. Silicon Bronze, Carbon Arc, Galvanized Corner Joint
S.M.A.W. Silicon Bronze, Carbon Arc, Galvanized Lap Joint
S.M.A.W. Silicon Bronze, Carbon Arc, Galvanized Butt Joint

Domain: S.M.A.W. Copper and Alloys

Building wear surface on Copper and its Alloys with S.M.A.W.
Building worn surfaces with S.M.A.W./on Copper Alloys,Brass,Bronze.Copper

Domain: S.M.A.W. Cast Iron

Hardsurface on Cast Iron with S.M.A.W.
S.M.A.W. Butt Joint Cast Iron
S.M.A.W. Lap Joint Cast Iron
S.M.A.W. Edge Joint Cast Iron
S.M.A.W. Tee Joint Cast Iron
S.M.A.W. Corner Joint Cast Iron

Domain: S.M.A.W. Carbon Steel

S.M.A.W. Plug Holes, Carbon Steel
Hard surface on Carbon Steel with S.M.A.W.
Build up Worn Surface to size on Steel before applying hard face material with S.M.A.W.
S.M.A.W. Carbon Steel, Butt Joint
S.M.A.W. Carbon Steel, Lapp Joint
Weld Edge Joint on Mild Steel with S.M.A.W.
S.M.A.W. Tee Joint Mild Steel
S.M.A.W. Carbon Steel Corner Joint

Domain: S.M.A.W.

Prepare Base Metal for Welding using S.M.A.W./ cutting with chamfertrode
Cut metal with S.M.A.W. cutting rod
S.M.A.W. Cutting of Stainless Sheet

Domain: Electronic Gas Arc Cast Iron, Steel Manual

Building wear surfacing on steel with the electronic gas arc process.
Building wear coat on cast iron with the electronic gas arc process.

Domain: Plasma Arc Cutting Automatic

Cut magnesium with plasma arc automatic cutting equipment.
Cut cast iron with plasma arc automatic cutting equipment.
Cut aluminum with plasma arc automatic cutting equipment.

Domain: Plasma Cutting Manual

Plasma arc cut manual cut magnesium.
Plasma arc cut manual cut alloy steel.
Plasma arc cutting manual cut aluminum.
Plasma arc cutting manual, cut steel
Plasma arc cut, manual cut copper and alloy.

Domain: Resistance Welding

Spot weld lapp joint on aluminum.
Spot weld lapp joint on mild steel part.
Spot weld lapp joint on mild steel.
Spot weld lapp joint on galvanized steel.
Spot weld lapp joint on stainless steel.
Weld on fluid with stud welder.
Seam weld lapp joint on mild steel with resistance seam welder.
Seam weld lapp joint on alloy steel with resistance seam welding.

TASKS ANALYSIS GUIDES

TASKS BY HUEY CALVAIN

The following section contains the tasks written by Huey Calvain. The tasks are outlined on this sheet. You will find the tasks in this section to be in the order as listed below.

VERIFY WELDING PROCEDURE
CARBON ARC AIR-CUT METAL ON CARBON STEEL
ARC AIR PREPARE EDGES FOR WELDING ON CARBON STEEL
REMOVE FATIGUED METAL WITH THE AIR CARBON ARC
ARC AIR-PREPARE EDGES FOR WELDING ON ALLOY STEEL
CARBON ARC AIR-BACKGOUGE-ON ALLOY STEEL
CARBON ARC AIR-REMOVE INFERIOR WELD DEPOSIT
CUT HOLES WITH ARC AIR-TORCH CARBON STEEL
CARBON ARC-PREPARE EDGES FOR WELDING ON CAST IRON
SPOT WELD LAP JOINT GALVANIZED STEEL
SEAM WELD LAP JOINT ALLOY STEEL
BUILD UP EDGES ON TOOL STEEL WITH THE OXY-ACETYLENE PROCESS
COPPER ALLOY BRAZE CAST IRON CORNER JOINT
SOLDER GALVANIZED SHEET EDGE JOINT
SOLDER GALVANIZED SHEET LAP JOINT
SOLDER GALVANIZED SHEET TEE JOINT
SOLDER COPPER LAP JOINT
SOLDER COPPER CORNER JOINT
SOLDER COPPER EDGE JOINT
SOLDER COPPER TEE JOINT
SILVER BRAZE TUNGSTEN CARBIDE LAP JOINT
SILVER BRAZE TUNGSTEN CARBIDE BUTT JOINT
SILVER BRAZE TUNGSTEN CARBIDE EDGE JOINT
SILVER BRAZE TUNGSTEN CARBIDE TEE JOINT
SILVER BRAZE COPPER EDGE JOINT
SILVER BRAZE COPPER BUTT JOINT
SILVER BRAZE COPPER LAP JOINT
SILVER BRAZE COPPER TEE JOINT
SOLVER GALVANIZED SHEET CORNER JOINT

TASK ANALYSIS GUIDE

I. Task Statement: VERIFY WELDING PROCEDURE

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

	TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
		Yes	No		
1.	Determine type of order.			2	Written verbal
2.	Determine type of welding process			3	SMAW GTAW GMAW OAW
3.	Determine type of metal to be welded			4	
4.	Determine standards and specifications			5	ASME AWS ASTM Milt. spe
5.	Determine type of code			6	
6.	Is there a pre-qualified procedure?	7	8		
7.	Determine the procedure from code or standard			EOT	ASME ASTM AWS Military Code Bridge
8.	Set up procedure			9	
9.	Have welding operator to weld procedure			10	
10.	Inspect samples			11	
11.	Are samples visually acceptable?	12	16		
12.	Have samples prepared for testing			13	
13.	Test samples			14	
14.	Are samples acceptable?	15	17		
15.	Document procedure				

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Determine visual defect cause			9	
17. Determine cause of failure			9	

TASK ANALYSIS GUIDE

I. Task Statement:

CARBON ARC AIR-CUT METAL ON CARBON STEEL

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order	2	19		
2. Determine metal thickness			3	rule, tape measure, gauge tools, decimal chart
3. Determine power source			4	
4. Determine electrode			5	electrode selection chart
5. Determine air pressure			6	
6. Set carbon arc equipment			7	electrode selection chart
7. Set amprage			8	
8. Set polarity			9	
9. Is work area free from hazards?	10	20		
10. Are parts in position to cut	11	21		
11. Put on safety clothing and protective equipment			12	safety glasses, shield, leather sleeves, gloves etc.
12. Insert electrode			13	
13. Check cutting paremeters			14	
14. Determine type of cut			15	bevel square, U groove J groove, etc.
15. Begin cutting operation			16	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Are all cutting variables correct	17	22		
17. Are all cutting variables to specifications?	18	23		
18. Complete cut			E.O.T.	
19. Read job print			2	
20. Clear area of all hazards			9	
21. Reposition parts			10	
22. Correct cutting variables			16	
23. Correct cutting variables to meet specifications			17	

TASK ANALYSIS GUIDE

I. Task Statement: ARC AIR PREPARE EDGES FOR WELDING ON CARBON STEEL

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2			
2. Determine metal thickness			3	measuring tools
3. Determine power source			4	A.C. D.C. volts amperages
4. Determine electrode			5	electrode selection chart
5. Determine air pressure			6	
6. Set carbon arc equipment			7	
7. Set amperage			8	
8. Set polarity			9	
9. Is work area free from hazards?	10	20		
10. Are parts properly aligned for cutting?	11	21		
11. Put on protective equipment and clothing			12	shield, safety glasses, leathers, gloves, etc.
12. Insert electrode			13	
13. Check cutting parameters			14	
14. Determine type of edge preparation			15	bevel edge, straight edge, etc.
15. Begin cutting operation			16	
16. Are all cutting variables correct?	17	22		electrode angle, travel speed, air pressure, etc.

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Are all cutting variables to specifications?	18	23		
18. Complete cut.			E.O.T.	
19. Read job print.			2	
20. Clear area of all hazards.			9	
21. Reposition parts.			10	
22. Correct cutting variables.			16	
23. Correct cutting variables to meet specifications.			17	

TASK ANALYSIS GUIDE

I. Task Statement: REMOVE FATIGUED METAL WITH AIR CARBON ARC

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order			2	verbal written job print
2. Determine amount of fatigued metal			3	
3. Determine power source.			4	A.C. D.C.
4. Determine Electrode			5	Electrode Specification Chart
5. Determine air pressure			6	
6. Set air carbon ARC equipment			7	amperage voltage air pressure
7. Set air pressure.			8	
8. Set current.			9	D.C. reverse D.C. straigh A.C.
9. Is work area free from hazards?	10	18		
10. Are parts properly aligned?	11	19		
11. Put on protective equipment.			12	Shield, gloves, leathers, safety glasses
12. Insert electrode			13	
13. Check cutting parameters			14	
14. Determine extent of gouge			15	
15. Beging cutting operation			16	
16. Are all cutting variables correct	17	20		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Complete removal of			EOT	
18. Clear area of all hazards			9	
19. Realign parts			10	
20. Correct cutting variables			16	

TASK ANALYSIS GUIDE

I. Task Statement: ARC AIR-PREPARE EDGES FOR WELDING ALLOY STEEL

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

	TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
		Yes	No		
1.	Determine type of work order			2	
2.	Determine metal thickness			3	Measuring tools, tape measure, micrometer, etc.
3.	Determine power source			4	
4.	Determine electrode			5	
5.	Determine air pressure			6	
6.	Set carbon ARC equipment			7	
7.	Set amperage			8	
8.	Set current			9	
9.	Is work area free from hazards?	10	19		
10.	Are parts positioned for cutting?	11	20		
11.	Put on protective clothing and safety equipment			12	Shield, leathers, gloves, safety glasses.
12.	Insert electrode			13	
13.	Check cutting parameters			14	
14.	Determine type edge.			15	Bevel, square, Vee, V. Groove, J.Groove Etc
15.	Begin cutting operation			16	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Are all cutting variables correct?	17	21		Electrode angle, travel speed, air pressure
17. Are all cutting variables to specifications?	18	22		
18. Complete cut.			EOT	
19. Clear area of all hazards			10	
20. Reposition parts			11	
21. Correct cutting variables.			17	
22. Correct cutting variables to meet specifications			18	

TASK ANALYSIS GUIDE

I. Task Statement: CARBON ARC AIR-BACKGOUGE ON ALLOY STEEL

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order			2	
2. Determine metal thickness			3	Rule, Tape Measure Gage tool, decimal and Fraction Charts
3. Determine power source			4	
4. Determine electrode			5	Electrode Selection Chart
5. Determine air pressure			6	
6. Set carbon arc equipment			7	
7. Set amperage			8	
8. Set current			9	A.C. D.C. Straight Polarity D.C. Reverse Polarity
9. Is work area free from hazards?	10	19		
10. Is part in position?	11	20		Position with C-clamp Vise Grips etc.
11. Put on safety clothing and equipment			12	Safety Glasses, Shield, Leather Jacket and Gloves etc.
12. Insert electrode			13	
13. Check gouging paremeters			14	
14. Determine extent of backgouge			15	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
15. Begin Backgouging			16	
16. Are all gouging variables correct?	17	21		
17. Are all gouging variables to specs?	18	22		
18. Complete gouging			EOT	
19. Clear area of all hazards			10	
20. Position parts			11	
21. Correct gouging variables			16	
22. Correct gouging variables to specifications.			17	

TASK ANALYSIS GUIDE

I. Task Statement: CARBON ARC AIR--REMOVE INFERIOR WELD DEPOSIT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order			2	Verbal writen job print
2. Determine extent of inferior weld metal.			3	
3. Determine power source			4	A.C. D.C.
4. Determine electrode			5	electrode specification chart
5. Determine air pressure			6	
6. Set air carbon ARC equipment			7	
7. Set air pressure			8	
8. Set current			9	A.C. D.C. reverse polarity D.C. straight polarity
9. Is work area free from hazards	10	18		
10. Is part in position for cutting	11	19		
11. Put on protective equipment			12	Shield, gloves, leathers safety glasses
12. Insert Electrode			13	
13. Check cutting parameters.			14	
14. Determine extent of inferior weld metal.			15	Incomplete fusion, convet, spatter
15. Begin removing weld metal.			16	Surface cracks, pin holes

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Are all cutting variables correct?	17	20		Electrode angle, travel speed, ampriage, air pressure
17. Complete removal of weld metal.			EOT	
18. Clear area of all hazards.			10	
19. Position part for cutting.			11	
20. Correct cutting variables.			17	

TASK ANALYSIS GUIDE

I. Task Statement: CUT HOLES WITH ARC AIR TORCH CARBON STEEL

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

	TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
		Yes	No		
1.	Is it a verbal order?	2	19		
2.	Determine metal thickness			3	Rule, tape measure gauge tool, decimal and fraction chart
3.	Determine power source			4	
	Determine electrode			5	Electrode selection chart
5.	Determine air pressure			6	
6.	Set carbon arc equipment			7	
7.	Set amperage			8	
8.	Set current			9	A.C.D.C. straight polarity D.C. reverse polarity
9.	Is work area free from hazards	10	20		
10.	Is part properly positioned	11	21		Positioners: Jig, fixtures, c clamps, vise grips, etc.
11.	Put on safety equipment and clothing			12	
12.	Insert electrode			13	Safety glasses, shields, leathers gloves
13.	Check gouging parameters			14	
14.	Determine size of hole to be cut			15	
15.	Begin cutting			16	
16.	Are all cutting variables correct?	17	22		
17.	Are all cutting variables to specifications	18	23		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
18. Complete cut			EOT	
19. Read job print			1	
20. Clear area of all hazards.			10	
21. Align part			11	
22. Correct cutting variables.			17	Electrode Angle, Travel Speed, Amperage Air Pressure
23. Correct cutting variables to specifications.			18	

TASK ANALYSIS GUIDE

I. Task Statement: CARBON ARC PREPARE EDGES FOR WELDING CAST IRON

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order	2	19		
2. Determine thickness of cast iron			3	rule, tape measure, micrometer
3. Determine power source			4	
4. Determine electrode			5	electrode selection chart
5. Determine air pressure			6	
6. Set carbon arc equipment			7	
7. Set amperage			8	
8. Set current			9	A.C., D.C., straight D.C. Reverse
9. Is work area free from hazards?	10	20		
10. Is part in position to cut?	11	21		
11. Put on safety clothing and protective equipment			12	safety glasses, safety shield, gloves, leather clothing
12. Insert electrode in holder			13	
13. Check cutting parameters			14	
14. Determine type of cut			15	Bevel Vee, U-Groove, Square Groove
15. Begin cutting			16	
16. Are all cutting variables correct?	17	22		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Are all cutting variables to specifications	18	23		
18. Complete cut			E.O.T.	
19. Read job print		2		
20. Clear area of all hazards			10	
21. Position part for cut			11	
22. Correct cutting variables			16	
23. Correct cutting variables to meet specifications			17	

TASK ANALYSIS GUIDE

I. Task Statement: SPOT WELD LAP JOINT GALVANIZED STEEL

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order		2		Written Verbal job print.
2. Determine thickness of material		3		Measuring Tools
3. Determine power source		4		Direct and indirect welding
4. Determine electrode		5		Parallel welding Series welding
5. Determine pressure		6		Squeeze time
6. Determine amount of heat		7		
7. Set Pressure		8		
8. Set amount of heat to be generated		9		
9. Is cleaning of parts needed?		10		Cleaning Methods: Chemical, Grind, Brush
10. Position parts		11		
11. Are parts properly aligned to form a lap joint?	12	19		Clamps
12. Put on safety equipment			13	Face shield gloves
13. Is work area free from hazards?	14	20		
14. Turn on spot welder			15	
15. Begin spot welding			16	
16. Are all spot welding variables correct?	17	21		
17. Are all spot welding variables to specifications?	18	22		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
18. Complete spot welding and shut down equipment			EOT	
19. Align parts to form a lap joint			10	
20. Clear area of all safety hazards.			12	
21. Correct spot welding variables			15	Squeeze time (pressure) Amount of heat clean electrodes file.
22. Correct spot welding variables to specifications.			16	Code or standard

TASK ANALYSIS GUIDE

I. Task Statement: SEAM WELD LAP JOINT ALLOY STEEL

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order.			2	Written, verbal, jobprint
2. Determine thickness of alloy steel.			3	Measuring tools: Tape measure scale micrometer
3. Determine type of alloy steel.			4	Type of alloy contained in job print.
4. Determine electrode welding wheels.			5	Electrode selection chart
5. Determine amount of heat to be generated.			6	Data chart
6. Determine wheel electrode and water pressure.			7	Data chart
7. Set seam welding equipment.			8	Squeeze time amount of heat speed of electrode wheel.
8. Clean and position parts.			9	Chemical, grind brush
9. Are parts properly aligned?	10	17		Clamps.
10. Put on safety equipment.			11	Face shield, gloves
11. Is work area free of hazards?	12	18		
12. Start seam welder and begin welding.			13	
13. Is wheel speed correct?	14	19		Travel speed found in Equipment manual
14. Is wheel pressure correct?	15	20		
15. Is heat generated correct?	16	21		
16. Complete seam welding.			EOT	
17. Align parts properly.			9	Alignment tools

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
18. Clear area of all hazards.			11	Paper trash flammable chemicals
19. Correct wheel speed increase or decrease.			13	Data chart
20. Correct pressure.			14	Data chart
21. Correct heat generated.			15	Data chart

TASK ANALYSIS GUIDE

I. Task Statement: BUILD UP EDGES ON TOOL STEEL WITH THE OXY-ACETYLENE PROCESS

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order			2	Verbal written job print
2. Determine amount of build up			3	
3. Determine type of edge preparation			4	Grind chip file carbon arc
4. Set up oxy-acetylene equipment			5	Cylinders, regulators, valves, hoses, tips, blow pipes
5. Determine type of filler			6	Filler metal Selection Chart
6. Are parts welded in position (flat)			7	in position: flat is in position
7. Position parts for welding			8	Holding tools, clamps vice grips
8. Put on safety equipment			9	Welding-goggles, gloves
9. Is work area free from hazards?	10	19		Safety hazards
10. Light welding torch			11	Friction lighter, spark lighter
11. Is flame adjusted correctly?	12	20		
12. Complete welding			13	
13. Turn off torch			14	
14. Visually inspect joint			15	
15. Is build up to specifications	16	21		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Is this the only part to build up?	17	6		
17. Dismantal Oxy-acetylene equipment			18	
18. Store equipment and tools			EOT	Store room
19. Clear area of all hazards			9	
20. Adjust to neutral flame			11	
21. Check and build up to requirement of specifications			15	

TASK ANALYSIS GUIDE

I. Task Statement: COPPER ALLOY BRAZE CAST IRON CORNER JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order.			2	Written, Verbal, Jobprint
2. Determine thickness of cast iron.			3	Standard measuring tools
3. Determine heat source.			4	Oxy-fuel
4. Determine type of cast iron.			5	Types of cast iron: Gray, White Mallable, Nodular Identification of Cast Iron: 1. Spark test 2. Chip test 3. Break test
5. Determine grade of copper alloy filler.			6	Filler Alloy Chart
6. Determine type of flux.			7	Zinc and Copper Powder, Flux Coated Rod
7. Prepare edges of parts.			8	Grind, Chip, Sand, Carbon Arc
8. Position parts.			9	Clamps, Vise Grips
9. Are parts properly aligned?	10	19		
10. Put on safety equipment.			11	#5 Dark Brazing Shield, Gloves
11. Is work area free from hazards?	12	20		
12. Light torch.			13	
13. Pre-heat cast iron.			14	See Pre-heat chart--It depends on the size and thickness of cast iron to what degree of pre-heat.
14. Begin brazing.			15	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
15. Are brazing variables correct?	16	21		Buttering, angle, pre-heat travel pressure
16. Are brazing variables to specifications?	17	22		Codes Standards
17. Complete brazing.			18	
18. Shut down equipment.			E.O.T.	
19. Properly align parts.			9	Alignment tools
20. Clear area of all hazards.			11	
21. Correct brazing variables.			15	
22. Correct brazing variables to specifications.			16	

TASK ANALYSIS GUIDE

I. Task Statement:

SOLDER GALVANIZED SHEET EDGE JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order			2	verbal written job print
2. Determine metal thickness			3	blue print
3. Determine heat source			4	rule measuring tape micrometer
4. Determine the solder			5	tin lead solder
5. Determine type of flux			6	past flux liquid
6. Set heat source			7	electric fuel gas
7. Is work area free from hazards	8	15		
8. Clean and position parts			9	acid, sandpaper, wire brush
9. Is part properly positioned	10	16		clamps
10. Put on safety equipment			11	safety glasses gloves
11. Begin soldering			12	spark lighter capillary attraction
12. Are all soldering variables correct	13	17		cold joint, oxidized metal, bridged joint
13. Are all soldering variables to specifications	14	18		
14. Complete soldering			E.O.T.	
15. Clear work area of all hazards			7	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Position parts correctly			9	
17. Correct soldering variables			12	
18. Correct soldering variables to specifications			14	

TASK ANALYSIS GUIDE

I. Task Statement: SOLDER GALVANIZED SHEET LAP JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order			2	verbal, written, job print
2. Determine metal thickness			3	blueprint rule, metal, gage,
3. Determine heat source			4	micrometer, electric, fuel gas
4. Determine type of solder			5	tin lead
5. Determine type of flux			6	paste, liquid
6. Set heat source			7	
7. Is work area free from hazards?	8	15		
8. Clean and position parts			9	sand paper, wire brush, acid, clamps
9. Are parts properly positioned?	10	16		
10. Put on safety equipment			11	safety glasses, gloves
11. Begin soldering			12	friction lighter
12. Are all soldering variables correct?	13	17		capillary attraction, cold joint, oxidized metal, bridge joint
13, Are all soldering variables to specifications?	14	18		
14. Complete soldering			E.O.T.	
15. Clear work area of all hazards			7	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Position parts correctly			9	
17. Correct soldering variables			12	
18. Correct soldering variables to specifications			13	

TASK ANALYSIS GUIDE

I. Task Statement: SOLDER GALVANIZED SHEET TEE JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order			2	verbal written job print, blue print
2. Determine metal thickness			3	rule, metal gauge micrometer
3. Determine heat source			4	
4. Determine type of solder			5	tin lead
5. Determine type of flux			6	liquid, paste
6. Clean and position parts			7	sand paper, wirebrush, acid
7. Are parts properly aligned?	8	15		"C" clamps, vice grips
8. Put on safety equipment			9	safety glasses, gloves
9. Is work area free from hazards?	10	16		
10. Adjust heat source			11	electric fuel gas, oxy-acetylene, propane natural, mapp.
11. Begin soldering			12	spark lighter, types of flames
12. Are all soldering variables correct?	13	17		capillary action, cold joint, bridged joint, oxidized metal codes and standards
13. Are all soldering variables to specifications	14	18		
14. Complete soldering			E.O.T.	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
15. Properly align parts			7	
16. Clear area of all hazards			9	
17. Correct soldering variables			12	
18. Correct soldering variables to specifications.			13	

TASK ANALYSIS GUIDE

I. Task Statement: **SOLDER COPPER LAP JOINT**

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order	2	15		
2. Determine heat source			3	
3. Determine solder			4	Solder and Flux Data Sheet
4. Determine Flux			5	
5. Set heating source			6	Oxy Fuel Equipment Acetylene, Mapp Gas, Natural Gas, Propane Gas.
6. Is work area free from hazards?	7	16		
7. Clean and position parts			8	
8. Are parts properly positioned?	9	17		Torches, Regulators Tips, Hoses.
9. Put on safety equipment			10	Safety glasses & Gloves
10. Light heat source			11	
11. Begin soldering			12	
12. Are all soldering variables correct	13	18		
13. Are all soldering variables to specs?	14	19		
14. Complete soldering			EOT	
15. Read print				Job Prints, Shop Drawings

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Clear area of all hazards			6	Combustables, Paper Paint Thinner, Oil, Gas, etc.
17. Properly align parts			8	
18. Correct soldering variables			12	Capillary Attraction Bridged Joint; Cold Solder, Oxidized Metal
19. Correct Soldering variables to specifications.			14	

TASK ANALYSIS GUIDE

I. Task Statement: SOLDER COPPER CORNER JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order.			2	Written, verbal, job print
2. Determine heat source.			3	
3. Determine solder.			4	
4. Determine type of flux.			5	Paste, liquid, acid
5. Set heat source.			6	Oxy-fuel: Propane, acetylene, natural, mapp, apache.
6. Is work area free of hazards?	7	15		Torch, tips mixers, regulators, hoses
7. Clean and position parts.			8	Sand paper, emry cloth, wire brush
8. Are parts properly positioned?	9	16		Clamps, vice grips, 'C' clamps, hammer
9. Put on safety equipment.			10	Safety glasses, gloves
10. Light heat source.			11	
11. Begin soldering.			12	
12. Are all soldering variables correct?	13	17		Capillary attraction. bridged joint, oxidized metal cold solder

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
13. Are soldering variables to specifications?	14	18		
14. Complete soldering.			EOT	
15. Clear work area of all hazards.			6	
16. Properly align parts.			8	
17. Correct soldering variables.			12	
18. Correct soldering variables to meet specifications.			14	

TASK ANALYSIS GUIDE

I. Task Statement: SOLDER COPPER EDGE JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order			2	Written, verbal, job print
2. Determine heat source			3	Oxy-fuel; propane acetylene natural, mapp gases
3. Determine type of solder			4	
4. Determine type of flux			5	Paste liquid, acid
5. Set heat source			6	Regulators, torch, tip mixer hoses
6. Is area free of hazards	7	15		
7. Clean and position parts			8	Sand paper, emery cloth, wire brush
8. Are parts properly positioned?	9	16		Clamps, vise grips hammer
9. Put on safety equipment			10	Safety glasses, gloves
10. Light heat source			11	
11. Begin soldering			12	
12. Are soldering variables correct?	13	17		
13. Are soldering variables to specifications	14	18		Capillary attraction Bridged joint, oxidized Metal cold solder.

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
14. Complete soldering			EOT	
15. Clear work area of all hazards			6	
16. Properly position parts			8	
17. Correct soldering variables			12	
18. Correct soldering variables to meet specifications			13	

TASK ANALYSIS GUIDE

I. Task Statement: SOLDER COPPER TEE JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order.			2	Written, verbal, job print
2. Determine heat source.			3	Oxy-fuel: acetylene natural, propane mapp
3. Determine solder.			4	50/50 tin lead, 95/5 tin lead, 45/55 tin lead
4. Determine type of flux.			5	Paste, liquid
5. Set heat source.			6	
6. Is work area free of hazards?	7	15		
7. Clean and position parts.			8	Sand paper, emery wire brush
8. Are parts properly positioned	9	16		Clamps, vice grips
9. Put on safety equipment.			10	Safety glasses, gloves
10. Light heat source.			11	Spark lighter, friction lighter
11. Begin soldering.			12	
12. Are all soldering variables correct?	13	17		Capillary attraction, cold joint, oxidized metal, bridged joint
13. Are soldering variables to specifications?	14	18		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
14. Complete soldering.			15	
15. Clear work area of all hazards.			EOT	
16. Properly position parts.			9	
17. Correct soldering variables.			13	
18. Correct soldering variables to specifications.			14	

TASK ANALYSIS GUIDE

I. Task Statement: SILVER BRAZE TUNGSTEN CARBIDE LAP JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order.			2	Work order: written, verbal, job print
2. Determine thickness of tungsten carbide.			3	Measuring tools
3. Determine type of edge preparation.			4	
4. Set up oxy acetylene equipment.			5	Cart, cylinders, manifold, regulators, valves, hoses, blowpipe tips
5. Determine filler material.			6	Selection chart Filler material
6. Determine type of flux.			7	High Temperature Low Temperature Paste or Liquid
7. Are parts to be brazed in position? (Flat)	8	23		Flat is in position brazing
8. Position and clamp part.			9	Holding tools: Clamps, Vise grips, etc.
9. Are parts positioned and aligned correctly?	10	24		Alignment tools
10. Put on safety equipment.			11	Safety Equipment: Tinted goggles, gloves
11. Is work area free from hazards?	12	25		Safety Hazards: Flammable Chemicals
12. Light torch.			13	Spark lighter Friction lighter
13. Is Flame proper?	14	26		
14. Is gas pressure correct?	15	27		
15. Complete brazing			16	
16. Turn off torch			17	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Clean joint			18	Hot water brush
18. Visually inspect weld			19	
19. Is brazed joint acceptable	20	28		
20. Is this the only part to be brazed?	21	8		
21. Dismantal oxy-acetylene equipment			22	
22. Store tools and equipment			EOT	
23. Determine the position parts to be brazed			8	
24. Position and align parts correctly (See work order)			9	
25. Clear work area of all hazards			11	
26. Determine proper flame			13	
27. Determine correct gas pressure			14	27 Equipment Manual
28. Determine brazing defect. Re-heat and Re-braze.			16	

TASK ANALYSIS GUIDE

I. Task Statement: SILVER BRAZE TUNGSTEN CARBIDE--BUTT JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal	2	23		Written verbal job print
2. Determine thickness of Tungsten Carbide			3	Thickness influences the amount of heat size of welding tip and diameter of filler material
3. Determine edge preparation			4	Clean, grind machine
4. Set up Oxy-acetylene brazing equipment			5	Brazing equipment: Cylinders, regulators flash arestors, hoses blowpipe, mixer tip
5. Determine filler material			6	Filler metal selection chart
6. Determine type of flux			7	High temp., low temp paste liquid
7. Are parts to be brazed in position (flat)?	8	24		Flat is in position brazing, horizontal vertical and overhead is out of position
8. Position and clamp parts to form a butt joint			9	Holding tools
9. Are parts positioned and aligned correctly?	10	25		Alignment tools

TASK ANALYSIS CUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
10. Put on safety equipment			11	Brazing goggles, gloves
11. Is work area free from hazards?	12	26		Safety hazards: Paper, rags, flammable chemicals
12. Light torch			13	Spark or friction lighter
13. Begin brazing			14	Torch angle travel speed
14. Is flame adjustment correct?	15	27		Neutral, oxidizing carburizing
15. Complete brazing			16	
16. Turn off torch			17	
17. Clean joint			18	Hot water and brush flux from joint
18. Visually inspect braze			19	Incomplete fusion, bridge joint porosity
19. Is brazed joint acceptable?	20	28		
20. Is this the only part to be brazed?	21	8		
21. Dismantal Oxy-acetylene equipment			22	
22. Store tools and equipment			EOT	
23. Read job print			2	
24. Determine the position parts are to be brazed in			8	
25. Position and align parts correctly			10	
26. Clear work area of all hazards			11	
27. Determine proper flame				Flames: Neutral Oxidizing carburizing

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
28. Determine braze defects, re-heat and re-braze			20	Braze Defects 1. Bridged joint 2. Overlap 3. Incomplete fusion 4. Poor joint clearance 5. Overheating 6. Underheating

TASK ANALYSIS GUIDE

I. Task Statement: SILVER BRAZE TUNGSTEN CARBIDE EDGE JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order.			2	Written Verbal Job Print
2. Determine thickness of Tungsten Carbide			3	Measuring Tools
3. Determine type of edge preparation			4	Square Groove Bevel butt
4. Set up Oxy-acetylene Equipment			5	Cylinders, regulators, flash arestors, hoses, blowpipe tip
5. Determine filler material			6	Silver alloy Selection Chart
6. Determine type of flux			7	High temp., low temp, paste, liquid
7. Are parts to be brazed in position.	8	23		Welding-Positions flat, horizontal, vertical overhead
8. Position parts to form an edge joint			9	
9. Are parts properly aligned	10	24		Alignment tools and holding devises.
10. Put on safety equipment			11	
11. Is work area free from hazards?	12	25	12	Flammable chemicals, paper, trash, rags
12. Light torch			13	Spark lighter Friction lighter
13. Begin brazing			14	Heat joint with flame neutral oxidizing carburizing

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
14. Is there capillary action?	15	26		Brazing alloy drawn completely through joint
15. Complete brazing			16	
16. Turn off torch			17	
17. Clean joint			18	Hot water and brush flux from part
18. Visually inspect weld			19	Magnifying glass, light
19. Is brazed joint acceptable?	20	27		
20. Is this the only part to be brazed?	21	11		
21. Dismantel oxy-acetylene equipment			22	
22. Store tools and equipment			EOT	Storage area
23. Determine position parts are to be brazed	8		8	Out of position is horizontal, vertical, and overhead.
24. Align parts properly		9		
25. Clear area of all hazards		11		
26. Check joint clearance, flame, gas pressure. Re-heat and braze.		14		
27. Re-work clean and re-braze.		19		

TASK ANALYSIS GUIDE

I. Task Statement: SILVER BRAZE TUNGSTEN CARBIDE TEE JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order.			2	Verbal, written, job print
2. Determine thickness of Tungsten Carbide			3	Measuring tools rule scale," micrometers
3. Determine type of edge prepartion			4	Grinding cleaning
4. Set up Oxy-acetylene brazing equipment			5	Brazing equipment cylinders, flash arestors, hoses blow pipe tip
5. Determine filler material			6	Filler metal Selection chart
6. Determine type of flux			7	High temperature, low temperature, paste, liquid
7. Are parts to be brazed in position (flat):	8	23		Flat is in position brazing
8. Position and clamp parts to form a tee joint			9	Holding and positioning tools
9. Are parts positioned and aligned correctly?	10	24		Alignment tools
10. Put on safety equipment			11	Brazing goggles gloves

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
11. Is work area free from hazards?	12	25		Safety hazards paper, trash, flammable chemicals
12. Light torch		13		Spark lighter friction
13. Is flame adjusted properly?	14	26		Flames: neutral oxidizing, carburizing
14. Is gas pressure correct? Begin brazing	15	27		
15. Braze.			16	
16. Turn off torch			17	
17. Clean joint			18	Hot water and brush flux from part.
18. Visually inspect weld			19	
19. Is brazed joint acceptable?	20	28		
20. Is this the only part to be brazed?	21	8		
21. Dismantle oxy-acetylene equipment			22	
22. Store tools and equipment			EOT	Storage area
23. Determine the position in which parts are to be brazed			8	Horizontal, vertical, overhead
24. Position and align parts correctly according to work order			10	
25. Clear work area of all hazards			12	
26. Determine proper flame			14	
27. Determine correct gas pressure			15	Metal thickness
28. Determine braze defects, reheat and rebraze			16	Bridged, overlap, incomplete fusion, joint clearance

TASK ANALYSIS GUIDE

I. Task Statement: SILVER BRAZE COPPER EDGE JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order			2	verbal, written, job print blueprint
2. Determine metal thickness			3	rule, metal gauge, micrometers
3. Determine heat source			4	oxy-fuel, air acetyene oxy-mapp, oxy-acetyene, propane, natural
4. Determine grade of silver alloy filler			5	silver brazing, fille alloy chart
5. Determine flux			6	high temp., low temp.
6. Clean and position parts			7	abrasive cloth, wire brush
7. Are parts properly aligned?	8	15		
8. Put on safety equipment			9	tinted safety glasses, gloves
9. Is work area free from hazards	10	16		
10. Light torch			11	friction lighter
11. Begin brazing			12	
12. Are all brazing variables correct?	13	17		
13. Are all brazing variables to specifications?	14	18		codes, standards
14. Complete brazing			E.O.T.	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
15. Properly align parts			7	
16. Clear work area of all hazards			9	
17. Correct brazing variables			12	
18. Correct brazing variables to specifications			13	

TASK ANALYSIS GUIDE

I. Task Statement: SILVER BRAZE COPPER BUTT JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order.			2	Verbal, written
2. Determine metal thickness.			3	Rule, metal gage, micrometers
3. Determine heat source.			4	Oxy fuel: mapp, acetylene, propane, natural
4. Determine grade of silver alloy.			5	Silver brazing, alloy filler chart
5. Determine flux.			6	High temperature, low temperature
6. Clean and position parts.			7	Abrasive cloth, wire brush, acid
7. Are parts properly aligned?	8	15		
8. Put on safety equipment.			9	Tinted safety glasses, gloves
9. Is work area free from hazards?	10	16		
10. Light torch.			11	Friction lighter, flames: neutral, oxidizing, carburizing
11. Begin brazing.			12	
12. Are all brazing variables correct?	13	17		
13. Are all brazing variables to specifications?	14	18		Codes, standards

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
14. Complete brazing.			EOT	
15. Properly align parts.			7	
16. Clear work area of all hazards.			9	
17. Correct brazing variables.			12	
18. Correct brazing variables to specifications.			13	

TASK ANALYSIS GUIDE

I. Task Statement: SILVER BRAZE COPPER LAP JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order			2	Verbal, Written, Job print, Blueprint
2. Determine metal thickness			3	Rule, Metal Gage Micrometers
3. Determine heat source			4	Oxy Fuel: Acetylene Mapp, Natural, Propane
4. Determine grade of silver alloy			5	Silver Brazing Filler Alloy Chart.
5. Determine flux			6	High Temp, Low Temp.
6. Clean and position parts			7	Abrasive Cloth, Wire Brush, Acid.
7. Are parts properly aligned?	8	15		C-clamps, Vise Grips, Jigs and Fixtures
8. Put on safety equipment			9	Tinted Safety Glasses Gloves
9. Is work area free from hazards?	10	16		
10. Light torch			11	Friction lighter, flames. Neutral oxidizing carburizing pressures
11. Begin brazing			12	
12. Are all brazing variables correct?	13	17		
13. Are all brazing variables to specifications?	14	18		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
14. Complete brazing			EOT	
15. Properly align parts			7	
16. Clear area of all hazards			9	
17. Correct brazing variables			12	
18. Correct brazing variables to specifications.			13	

TASK ANALYSIS GUIDE

I. Task Statement: SILVER BRAZE COPPER TEE JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order.			2	Verbal, written, jobprint, blueprint.
2. Determine thickness of copper.			3	Rule, metal micrometers
3. Determine heat source.			4	Oxy-fuel Oxy-acetylene
4. Determine grade of silver alloy filler.			5	Silver brazing alloy chart
5. Determine flux.			6	High temperature Low temperature
6. Clean copper.			7	Abrasive cloth wire brush
7. Position parts.			8	Vice grips, 'C' clamp flat horizontal vertical overhead
8. Are parts properly aligned?	9	21		
9. Put on safety equipment.			10	Tinted safety glasses, gloves
10. Is work area free from hazards?	11	22		
11. Light torch.			12	Friction lighter
12. Begin silver brazing.			13	
13. Is flame adjustment correct?	14	23		
14. Complete brazing.				
15. Turn off torch.			16	
16. Clean joint.			17	
17. Visually inspect braze.			18	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
18. Is brazed joint acceptable?	19	24		
19. Dismantal brazing equipment.			20	
20. Store tools and equipment.			EOT	
21. Position and realign parts.			8	
22. Clear area of all hazards.			10	
23. Determine proper flame.			13	Flames: 1. neutral 2. oxidizing 3. carburizing
24. Determine braze defects.			18	Braze defects: 1. Bridged joint 2. Overlap 3. Incomplete fusion 4. Poor joint clearance 5. Oxidized metal

TASK ANALYSIS GUIDE

I. Task Statement: SOLDER GALVANIZED SHEET CORNER JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Determine type of work order			2	verbal, written, job print, blueprint
2. Determine metal thickness			3	rule, metal gauge micrometers
3. Determine heat source			4	electric, oxyfuel acetylene mapp, natural, propane
4. Determine type of solder			5	tin lead
5. Determine type of flux			6	liquid, paste
6. Clean and position parts			7	sandpaper, wire brush, acid
7. Are parts properly aligned?	8	15		
8. Put on safety equipment			9	safety glasses, gloves
9. Is work area free from hazards?	10	16		
10. Adjust heat source			11	
11. Begin soldering			12	
12. Are all soldering variables correct?	13	17		Capillary action, cold joints, oxidized metal bridged joint
13. Are all soldering variables to specifications?	14	18		codes, standards
14. Complete soldering			E.O.T.	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
15. Properly align parts			7	
16. Clear work area of all hazards			9	
17. Correct soldering variables			12	
18. Correct soldering variables to specifications			13	

TASKS BY JAN CONWAY

The following section contains the tasks written by Jan Conway. The tasks are outlined on this sheet. You will find the tasks in this section to be in the order as listed below.

CHECK WELDING EQUIPMENT TO BE USED
REMOVE DISTORTION IN WELDMENT USING HEAT
MARK WHERE SLOT IS TO BE MACHINED
FORGE METALS TO SHAPE USING HEAT
G.T.A.W. AUTO ALUMINUM CORNER JOINT
G.T.A.W. MILD STEEL SPOT WELD
G.T.A.W. AUTO ALUMINUM SPOT WELD
G.T.A.W. STAINLESS STEEL EDGE JOINT
G.T.A.W. STAINLESS STEEL CORNER JOINT
G.T.A.W. TOOL STEEL TEE JOINT
G.T.A.W. TOOL STEEL LAP JOINT
G.T.A.W. STAINLESS STEEL SPOT WELD
HARD FACE ALLOY STEEL WITH OXY-ACETYLENE EUTALLOY SPRAY PROCESS
G.T.A.W. TOOL STEEL BUTT JOINT
G.T.A.W. TOOL STEEL CORNER JOINT
HARD FACE SURFACE AREAS WITH THE EUTALLOY SPRAY PROCESS ON COPPER AND ALLOYS
BUILD WORN PARTS USING THE EUTALLOY SPRAY PROCESS ON STEEL
G.T.A.W. IRON HARD FACE
BUILD WORN AREAS ON CAST IRON WITH EUTALLOY SPRAY PROCESS
BUILD WORN SURFACE WITH THE EUTALLOY SPRAY PROCESS ON COPPER AND ALLOYS
HARD FACE AREAS ON CAST IRON WITH THE EUTALLOY SPRAY PROCESS
S.M.A.W. HARD SURFACE CARBON STEEL
S.M.A.W. CUT METAL CUTTING ROD
S.M.A.W. CUTTING STAINLESS STEEL
S.M.A.W. WORN SURFACE BEFORE APPLYING HARD FACE MATERIAL
G.T.A.W. (SILICON BRONZE) COPPER ALLOYS LAP JOINT
G.T.A.W. HARD FACE EDGES TOOL STEEL
S.M.A.W. PREPARE BASE METAL WITH CHAMFER
G.T.A.W. SILICON BRONZE COPPER ALLOYS BUTT
S.M.A.W. CAST IRON BUTT JOINT

TASK ANALYSIS GUIDE

I. Task Statement: CHECK WELDING EQUIPMENT TO BE USED.

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	7		
2. Is there a list of equipment to be used?	3	8		
3. Go through the list and make sure you have the needed equipment.			4	
4. Check each piece of equipment to make sure it works.			5	
5. Does each piece work safely?	6	9		
6. Fill out inspection sheet and turn in to supervisor.			E.O.T.	
7. Read the work order.			2	
8. See supervisor for equipment list to be checked.			3	
9. See that equipment is replaced or repaired.			10	
10. Fill out repair request and give to supervisor.			6	

TASK ANALYSIS GUIDE

I. Task Statement: REMOVE DISTORTION IN WELDMENT USING HEAT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	14		
2. Locate the piece/pieces that have distortion in them.			3	
3. Is the distortion visible?	4	15		
4. Can the areas needing heat be determined?	5	16		
5. Obtain the necessary oxy-fuel equipment.			6	Torch, regulations tips, hoses, etc.
6. Obtain the necessary tools.			7	
7. Do you know how hot to heat the metal?	8	17		Temperature chart.
8. Heat the metal as needed.			9	Removing distortion with oxy-fuel flâme, "Welding Encyclopedia"
9. Is water needed for quick cooling?	18	10		
10. As the metal cools, is it straightened?	11	19		
11. Shut down the oxy-fuel equipment.			12	oxy-acelytene handbook
12. Put up tools.			13	
13. Clean up area.			E.O.T.	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
14. Read the work order.			2	
15. Use a straight edge to locate distortion.			4	Check with immediate supervisor
16. Locate supervisor to determine problem area.				
17. Check with supervisor			8	
18. Obtain water in a container that will localize the pour.			10	Radiator fill can water sprinkler can.
19. Reheat base metal as necessary.			10	

TASK ANALYSIS GUIDE

I. Task Statement: MARK WHERE SLOT IS TO BE MACHINE CUT.

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	11		
2. Read the print.			3	
3. Obtain the material to be layed out.			4	
4. Obtain the layout tools.			5	Rule, Square counter punch, hammer, soap stone-print.
5. Is necessary information on the print from which to make the layout?	6	12		
6. Make the necessary measurements.			7	
7. Apply marks on material.			8	
8. Can lines be seen clearly?	9	13		
9. Check layout with print.			10	
10. Is the layout correct?	E.O.T.	14		
11. Read the work order.			3	
12. Check with person in charge for answer.			6	
13. Remark lines heavier.			9	
14. Remark according to print.			10	

TASK ANALYSIS GUIDE

I. Task Statement: FORGE METALS TO SHAPE USING HEAT.

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal	2	21		
2. Read the print.			3	
3. Obtain the metal which must be forged.			4	
4. Is the shape the metal must be forged to known?	5	22		
5. Obtain the necessary forging tools.			6	tongs, hammer
6. Is the correct heating process to use known?	7	23		
7. Put on all safety equipment.			8	
8. Prepare the metal to be forged.			9	grinder, wire brush
9. Set-up the heating equipment			10	furnace, oxy-fuel equip.
10. Heat metal to proper forging temp.			11	1300-1600^{0}F.
11. Remove metal from heat source to anvil			12	
12. Forge metal to desired shape.			13	
13. Does metal need to be reheated?	14	15		
14. Heat metal to proper forging temp.			15	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
15. Remove to anvil and forge. Repeat if necessary.			16	
16. Is the metal shaped to specifications	17	24		
17. Shut down heat source.			18	
18. Place metal in sand or heat retardent material			19	
19. Put up tools			20	
20. Clean up area.			E.O.T.	
21. Read the work order			2	
22. Recheck the print, and see supervisor.			5	
23. Check with supervisor.			7	
24. Can the metal be saved.	25	26		
25. Reheat and reshape to correct specification.			16	
26. Obtain new metal and start over.			2	

TASK ANALYSIS GUIDE

I. Task Statement: GTAW ALUMINUM CORNER JOINT AUTOMATIC.

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2			
2. Read the print			3	
3. Obtain the aluminum pieces			4	
4. Put the pieces of aluminum in the holding fixture.			5	
5. Is the machine ready for use?	6	21		
6. Turn on machine			7	
7. Turn on shielding gas			8	
8. Turn on carriage power			9	
9. Turn on wire feed mechanism			10	
10. Is tungsten in working condition?	11	22		
11. Adjust tungsten to work distance			12	
12. Set flow meter to correct gas flow				See manual for gas flow
13. Is correct wire size in feeder mechanism?	14	23		See manual for Wire Size needed
14. Put on proper eye protection.			15	
15. Trigger switch to activate welding operation			16	
16. Remove weld from fixture			17	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Does quality of weld meet specifications	18	24		
18. Turn off all power			19	
19. Turn off shielding gas			E.O.T.	
20. Read work order			2	
21. Have supervisor make needed repairs			6	
22. Grind tungsten clean and to desired contour			11	
23. Have supervisor replace wire to correct size			14	
24. Contact supervisor			25	
25. Make necessary corrections on set-up			15	

TASK ANALYSIS GUIDE

I. Task Statement: GTAW MILD STEEL SPOT WELD

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	16		
2. Read the print			3	Blueprint
3. Obtain the steel with which to make the weld			4	
4. Can the machine be set correctly?	5	17		Spot welding manual
5. Set-up the machine			6	
6. Put on safety equipment			7	
7. Prepare the surface of the steel for spot welding.			8	Wire brush
8. Is a fixture needed?	18	9		
9. Align the steel pieces			10	
10. Put steel between electrodes.			11	
11. Is the clamping pressure sufficient?	12	19		
12. Turn on spot welder			13	
13. Make the weld			14	
14. Did the spot achieve fusion?	15	20		
15. Does the spot meet the size specs on the print?	E.O.T.	21		
16. Read the work order			2	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Get instructions from supervisor/ read the manual			5	
18. Obtain a fixture			9	
19. Tighten pressure between electrodes			12	See manual
20. Increase hold time.			15	manual
21. Recheck print, make corrections on equipment			22	
22. Reweld spot to specs			15	

TASK ANALYSIS GUIDE

I. Task Statement: G.T.A.W. ALUMINUM SPOT WELD AUTOMATIC

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	20		
2. Read the print			3	
3. Obtain the aluminum pieces to be welded.			4	
4. Put the pieces to be welded in the holding fixture.			5	
5. Is the machine ready for use?	6	21		
6. Turn on machine			7	
7. Turn on shielding gas			8	
8. Set flow meter to correct shielding gas setting.			9	
9. Turn on carriage power			10	
10. Is tungsten in working condition?	11	22		
11. Is wire needed to make spot weld?	12	13		
12. Is correct size wire in wire feed mechanism?	13			
13. Does tungsten to work distance need adjusting?	23	14		
14. Put on proper eye protection			15	
15. Trigger switch to activate welding operation.			16	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Remove weldment from fixture			17	
17. Does quàlity of weld meet specifications	18	24		
18. Turn off all power			19	
19. Turn off shielding gas			E.O.T.	
20. Read the work order.			2	
21. Have supervisor make needed repairs.			6	
22. Grind tungsten clean and to correct contour			11	
23. Adjust to correct heighth.			14	
24. Make necessary corrections on set-up.			15	

TASK ANALYSIS GUIDE

I. Task Statement: **G.T.A.W. STAINLESS STEEL EDGE JOINT**

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	21		
2. Read the print			3	Print
3. Obtain the stainless steel pieces			4	Stainless reference
4. Is filler wire needed?	5	6		
5. Obtain the filler wire			6	Metal specs
6. Set-up the GTAW equipment			7	
7. Determine the welding position			8	
8. Put on safety clothing and welding gear			9	
9. Prepare stainless steel for welding.			10	
10. Set-up the weld joint			11	
11. Tack joint together			12	
12. Does joint meet print specs?	13	22		
13. Determine the extent of welding to be done			14	
14. Determine the depth of fusion			15	
15. Determine the size of weld			16	
16. Begin welding			17	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Are the welding variables correct?	18	23		
18. Is there a uniform bead structure forming?	19	24		
19. Does the weld meet blueprint specs?	20	25		
20. Turn off equipment			E.O.T.	
21. Read the work order			2	
22. Remove tack welds			13	
23. Correct the variables			18	
24. Correct the welding technique			19	
25. Can the work be salvaged?	27	26		
26. Scrap workpiece.			3	
27. Remove weld.			9	

TASK ANALYSIS GUIDE

I. Task Statement: G.T.A.W. STAINLESS STEEL CORNER JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	21		
2. Read the print			3	
3. Obtain the stainless steel pieces from which to make the weld.			4	
4. Is filler wire needed?	5	6		
5. Obtain the correct filler wire			6	
6. Set-up the G.T.A.W. equipment.			7	
7. Determine the welding position			8	
8. Put on safety clothing and welding gear			9	
9. Prepare the stainless for welding			10	Clean off oil, dust, grease, etc
10. Is a welding fixture needed?	22	11		
11. Set-up the corner joint			12	
12. Tack the joint together			13	
13. Does the joint meet print specifications	14	23		
14. Determine the extent of welding to be done			15	
15. Determine the depth of fusion			16	
16. Begin welding			17	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Are the welding variables correct?	18	24		See welding manual.
18. Is there a uniform bead structure forming?	19	25		
19. Does the weld meet blueprint specs?	20	26		
20. Turn off equipment			E.O.T.	
21. Read the work order.			3	
22. Obtain a corner joint fixture			11	
23. Grind out tacks, and realign joint to meet specs.		14		
24. Correct the variables			18	
25. Correct welding technique so that uniform bead is formed.			19	
26. Remove defective area and reweld			20	

TASK ANALYSIS GUIDE

I. Task Statement: G.T.A.W. TOOL STEEL TEE JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal	2	23		
2. Read the print			3	Blueprint
3. Obtain the tool steel with which to make the weld			4	Tool Steel Plates
4. Determine the Correct type of filler wire			5	Metal Specs.
5. Obtain the filler wire.			6	
6. Determine the welding position.			7	
7. Put on welding clothes and safety gear			8	
8. Prepare tool steel for welding			9	
9. Is a welding fixture needed?	25	10		Fixture or supplies
10. Set up the joint			11	
11. Tack weld the joint			12	
12. Preheat metal to be welded			13	Oxy-fuel torch Preheat furnace
13. Does the joint meet the specs	14	26		Mfg. Preheat chart
14. Determine the extent of welding			15	
15. Determine the depth of fusion			16	
16. Determine the size of the weld			17	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Begin welding			18	
18. Is there a uniform bead structure forming?	19	27		
19. Are the welding variables correct?	20	28		
20. Does the weld meet blueprint specs?	21	29		
21. Turn off equipment			22	
22. Cool weldment			E.O.T.	Slowly cool
23. Read work order			2	
24. Locate and read specs			5	
25. Locate or build tee joint fixture			11	
26. Break tacks correct joint design to meet specs			15	
27. Correct welding technique			20	
28. Correct incorrect welding variables			21	
29. Remove defective weld			31	
30. Reweld defective area			21	

TASK ANALYSIS GUIDE

I. Task Statement: G.T.A.W. TOOL STEEL LAPP JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	26		
2. Read the drawing.			3	
3. Select the tool steel.			4	
4. Obtain tool steel specs.			5	
5. Determine the correct type filler wire.			6	
6. Obtain the filler wire.			7	
7. Determine welding position.			8	
8. Put on welding clothes and safety gear.			9	
9. Prepare tool steel for welding.			10	
10. Do you need a fixture?	27	11		
11. Set-up the joint.			12	
12. Tack weld the joint.			13	
13. Preheat metal to be welded.			14	oxy-fuel equip. mfg. preheat specs.
14. Does the joint meet specs?	15	28		
15. Determine the extent of welding.			16	
16. Determine the depth of fusion.			17	
17. Determine the size of weld.			18	
18. Begin welding.			19	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
19. Is there a uniform bead forming?	21	20		
20. Correct welding technique.			21	
21. Are the welding variables correct?	23	22		
22. Correct the variables.			23	
23. Does the weld meet print specifications?	24	30		
24. Turn off equipment.			25	
25. Cool weld slowly in sand, vermiculite, or post-heating furnace.			E.O.T.	
26. Read the work order.			2	
27. Locate or build welding fixture.			11	
28. Break tack, correct joint to meet specifications.			15	
29. Remove defective weld area.			30	
30. Reweld defective area.			23	

TASK ANALYSIS GUIDE

I. Task Statement: G.T.A.W. STAINLESS STEEL SPOT WELD.

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	15		
2. Read the print.			3	
3. Obtain the stainless with which to make the weld.			4	
4. Determine method of setting up the machine.			5	operation manual for spot welder.
5. Set-up the machine.			6	
6. Put on safety equipment.			7	
7. Prepare the stainless surface for spot welding.			8	
8. Is a holding fixture needed?	16	9		
9. Align the stainless.			10	
10. Is clamping pressure sufficient?	11	17		
11. Turn on power.			12	
12. Make the weld.			13	
13. Did the spot achieve fusion?	14	18		
14. Does the spot meet the size specs. on the print?	E.O.T.	19		
15. Read the work order.			2	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Obtain or build fixture.			9	
17. Tighten up adjustments for electrode pressure.			11	
18. Increase heat timer.			13	
19. Correct weld size to conform with print specs.			14	

TASK ANALYSIS GUIDE

I. Task Statement: HARDFACE ALLOY STEEL USING OXY-ACETYLENE WITH EUTALLOY SPRAY PROCESS

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	24		
2. Read the print			3	
3. Obtain the alloy steel which is to be hardfaced			4	
4. Is the service requirement for the hardfacing understood?	5	25		
5. Can the correct powder for the job application be selected?	6	26		
6. Obtain the correct powder to be sprayed.				
7. Clean surface to be hardfaced			8	
8. Does the alloy steel need to be undercut?	27	9		
9. Put on safety equipment			10	
10. Does part need to be turned in lathe or turning machine?	28	11		
11. Put on welding gear				
12. Set up tanks and eutalloy spray equipment			13	Oxy-acetylene Handbook Eutectic spray procedure manual
13. Preheat alloy to suitable spraying temperature			14	
14. Begin applying hardfacing powder			15	
15. Is the powder wetting out and appearing to be glassy?	16	30		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Complete hardfacing application			17	
17. Fuse powder to base metal that appears to be flakey.			18	
18. Does the surface need to be machined?	32	19		
19. Does the built-up area meet service specifications?	20	33		
20. Shut down equipment			21	
21. Disconnect and put away eutalloy spray outfit			22	
22. Put away tools			23	
23. Clean up area			E.O.T.	
24. Read the work order			2	
25. Check with supervisor			5	See spray service chart
26. Read eutalloy spray manual/ check with supervisor			6	
27. Undercut to proper depth			9	Lathe, Mill, Shaper
28. Place part in lathe or turning fixture.			29	
29. Set machine to proper RPM.			11	
30. Increase flame temperature.			31	
31. Check work to tip distance.			16	
32. Machine surface to correct size.			20	
33. Remove defective hardface material.			4	

TASK ANALYSIS GUIDE

I. Task Statement: GTAW TOOL STEEL **BUTT** JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal	2	25		
2. Read the print			3	
3. Select the tool steel			4	
4. Do you have tool steel specs?	5	26		
5. Determine the correct type filler wire.			6	
6. Obtain the filler wire			7	
7. Determine welding position			8	
8. Put on welding clothes and safety gear.			9	
9. Prepare the tool steel for welding			10	
10. Is a fixture needed?	27	11		
11. Set up the joint			12	
12. Tack weld the joint			13	
13. Preheat metal to be welded			14	Oxy-fuel equipment MFG. preheat specs.
14. Does the joint meet specs?	15	28		
15. Determine the extent of welding			16	
16. Determine the depth of fusion			17	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Determine the size of the weld			18	
18. Begin welding			19	
19. Is there a uniform bead forming?	20	29		
20. Are the welding variables correct	22	21		
21. Correct welding variables			22	
22. Does the weld meet print specs?	23	30		
23. Turn off all equipment			24	
24. Cool weld slowly in sand or vermiculite.			E.O.T.	
25. Read the work order			2	
26. Locate and read steel specs.			5	
27. Locate or build butt welding fixture.			11	
28. Correct joint design to meet specs.			15	
29. Correct welding technique			20	
30. Remove defective weld.			31	
31. Reweld defective area			22	

TASK ANALYSIS GUIDE

I. Task Statement: G.T.A.W. TOOL STEEL CORNER JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	23		
2. Read the print.			3	
3. Obtain the tool steel with which to make the weld.			4	
4. Determine type of tool steel filler wire needed.			5	mfg. flyer on type of tool steel. "Welding Specs."
5. Obtain the filler wire.			6	
6. Determine welding position.			7	
7. Put on welding clothing and safety gear.			8	
8. Prepare the tool steel for welding.			9	
9. Do you need a holding fixture?	24	10		
10. Set up the joint.			11	
11. Tack weld joint.			12	
12. Preheat metal to be welded.			13	Oxy-fuel equipment MFG. preheat specs.
13. Does the joint meet specs?	14	25		
14. Determine the extent of welding.			15	
15. Determine the depth of fusion.			16	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Determine the size of the weld.			17	
17. Begin welding.			18	
18. Is there a uniform bead structure forming?	19	26		
19. Are the welding variables correct?	21	20		
20. Correct variables.			21	
21. Does the weld meet print specs?	22	27		
22. Turn off all equipment.			E.O.T.	
23. Read the work order.			2	Written work order
24. Locate or build corner fixture.			10	
25. Correct to specifications.			14	
26. Correct welding technique.			19	Read text-Demo-Instructor
27. Remove defective weld.			28	
28. Reweld defective area.			21	

TASK ANALYSIS GUIDE

I. Task Statement: HARDFACE SURFACE AREA WITH THE EUTALLOY SPRAY PROCESS ON COPPER AND ALLOYS

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	27		
2. Read the print.			3	
3. Obtain the copper alloy which is to be hardfaced.			4	
4. Is the service requirement known for the hardfacing?	5	28		Eutalloy hardfacing chart
5. Is the correct hardfacing powder known?	6	29		
6. Obtain the correct hardfacing powder.			7	
7. Clean area to be hardfaced.			8	
8. Put on safety equipment.			9	
9. Does worn surface need to be undercut?	30	10		
10. Does the weldment need to be revolved during hardfacing?	11	13		
11. Mount work in lathe or suitable turning machine.			12	
12. Set to suitable RPM.			13	
13. Put on welding gear.			14	
14. Set up tanks, and eutalloy spray equipment.			15	
15. Preheat weldment to suitable spraying temperature.			16	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Begin applying hardfacing powder.			17	
17. Does the powder appear glassy as it spreads out?	18	31		
18. Complete hardfacing operation.			19	
19. Fuse area to the base metal that appears to be flakey.			20	
20. Does the surface need to be machined?	21	22		
21. Machine the surface to the proper heighth and finish.			22	
22. Does the hardface meet the service specifications.	23	32		
23. Shut down tanks.			24	
24. Disconnect and put away spray equipment.			25	
25. Put away tools.			26	
26. Clean work area.			E.O.T.	
27. Read work order			2	
28. See eutalloy manual, check with supervisor.			5	Eutalloy manual
29. See powder manual, check with supervisor.			6	
30. Undercut to appropriate depth.			10	
31. Increase flame temperature, readjust powder flow.			18	
32. Remove defective hardface.			4	

TASK ANALYSIS GUIDE

I. Task Statement: BUILD WORN STEEL PARTS USING THE EUTALLOY SPRAY PROCESS

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	24		
2. Read the print.			3	
3. Obtain the worn part which is to be hardfaced.			4	
4. Is the service requirement for the hardfacing understood?	5	25		
5. Can the correct powder for the job application be selected?	6	26		
6. Obtain the correct powder to be sprayed.			7	
7. Clean surface to be hardfaced.			8	
8. Does the worn area need to be undercut?	27	9		
9. Put on safety equipment.			10	
10. Does part need to be turned during welding operation?	28	11		
11. Put on welding gear.			12	Oxy-acetylene handbook
12. Set-up tanks and eutalloy spray equipment.			13	Eurectic Spray procedure manual
13. Preheat part to suitable spraying temperature.			14	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
14. Begin applying powder.			15	
15. Is the powder wetting out and appear to be glassy?	16	30		
16. Complete hardface application.			17	
17. Fuse power to base metal that appear to be flakey.			18	
18. Does the surface need to be machined?	32	19		
19. Does the built-up area meet the service specifications?	20	33		
20. Shut down tanks and eutalloy spray equipment.			21	
21. Disconnect and put away spray equipment.			22	
22. Put away tools.			23	
23. Clean up area.			E.O.T.	
24. Read the work order.			2	
25. Check with supervisor.			5	
26. Check with supervisor, read eutalloy spray manual.			6	
27. Undercut the alloy steel as needed.			9	Lathe, mill, shaper
28. Put part into lathe or turning machine.			29	
29. Set machine to turn proper RPM for spraying.			11	
30. Increase flame temperature, slow down powder deposition.			31	
31. Check tip to work distance.			16	
32. Machine surface to correct size.			19	
33. Remove defective hardface material.			4	

TASK ANALYSIS GUIDE

I. Task Statement: G.T.A.W CAST IRON HARD FACE

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	20		
2. Read the print.			3	
3. Obtain the cast iron which needs hardfaced.			4	
4. Determine size and type of hardface wire to use.			5	Hardface manual
5. Set up the G.T.A.W equipment.			6	
6. Determine the welding location and position.			7	
7. Put on safety clothing and protective welding gear.			8	
8. Is preheating needed?	22	9		
9. Clean surface to be hardfaced.			10	
10. Determine extent of hardface to be applied.			11	
11. Determine size of build-up.			12	
12. Will more than one layer of weld be necessary?	23	13		
13. Begin hardfacing.			14	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
14. Is there a uniform bead forming?	15	24		
15. Are the weld variables correct?	16	25		
16. Does the weld deposit meet the specs?	17	26		
17. Is welded area of proper heighth?	18	28		
18. Turn off machine.			19	
19. Does weld need post heat?	29	E.O.T.		
20. Read the work order.			2	
21. Check with supervisor on size and type or check.			5	Hardfacing manual
22. Preheat cast iron to recommended temp.			9	Preheat calculator
23. Weld second layer if necessary.			13	
24. Correct welding technique.			15	
25. Correct weld variables.			16	
26. Remove faulty hardface material.			27	
27. Reweld defective area.			17	
28. Deposit weld until the proper heighth is obtained.			18	
29. Post heat weld to correct temperature.			E.O.T.	Furnace oxy-fuel temp. stick.

TASK ANALYSIS GUIDE

I. Task Statement: BUILD WORN AREAS ON CAST IRON WITH EUTALLOY SPRAY PROCESS.

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	25		
2. Read the print			3	
3. Obtain the metal which is to be hardfaced.			4	
4. Are the service requirements for the hardfacing known?	5	26		
5. Can the correct powder for the application be selected?	6	27		
6. Obtain the correct powder to be sprayed.			7	
7. Clean worn areas to be built up.			8	Grind, Sand Blast
8. Put on safety equipment			9	
9. Does weldment need to be turned during hardfacing operation?	10	12		
10. Mount work in lathe or turning machine.			11	
11. Set to suitable R.P.M.			12	
12. Put on welding gear.			13	
13. Set up tanks and eutalloy equipment to spray.			14	
14. Preheat work piece to suitable spraying temperature.			15	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
15. Begin applying hardfacing powder.			16	
16. Does the powder appear glassy as it spreads out?	17	28		
17. Complete hardface build-up.			18	
18. Fuse areas to the base metal that appear to be flakey.			19	
19. Does the surface need to be machined?	29	20		
20. Does the surface area meet the specs?	21	30		
21. Shut down equipment.			22	
22. Disconnect and put away eutalloy spray outfit.			23	
23. Put away tools			24	
24. Clean up work area			E.O.T	
25. Read the work order			2	
26. Check with supervisor **and** read the eutalloy spray chart.			5	Factory Rep.
27. Check with supervisor. See eutalloy spray chart.			6	
28. Increase flame temperature, slow down powder deposition.			17	
29. Machine to proper size.			20	Lathe, Mill, Shaper, etc.
30. Remove defective hardface deposit.			4	

TASK ANALYSIS GUIDE

I. Task Statement: BUILD WORN SURFACE WITH THE EUTALLOY SPRAY PROCESS ON COPPER AND ALLOYS.

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	27		
2. Read the print.			3	
3. Obtain the copper alloy with the worn surface to be hardfaced.			4	EUT
4. Is the service requirement for the hardfacing known?	5	28		Eutalloy hardfacing chart.
5. Is the correct hardfacing powder to use known?	6	29		
6. Obtain the correct hardfacing powder.			7	
7. Clean work area to be hardfaced.			8	
8. Put on safety equipment.			9	
9. Does area to be hardfaced need to be undercut?	30	10		
10. Does the weldment need to be revolved during hardfacing?	11	13		
11. Mount work in lathe or suitable turning machine.			12	
12. Set to suitable RPM.			13	
13. Put on welding gear.			14	
14. Set up tanks and eutalloy spray equipment.			15	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
15. Preheat weldment to suitable spraying temperature.			16	
16. Begin applying hardfacing powder.			17	
17. Does the powder appear glassy as it spreads out?	18	31		
18. Complete hardfacing operation.			19	
19. Fuse area to the base metal that appears to be flakey.			20	
20. Does the surface need to be machined?	21	22		
21. Machine the area to the proper heighth and finish.			22	
22. Does the hardface meet the service specifications?	23	32		
23. Shut down tanks.			24	
24. Disconnect and put away spray equipment.				
25. Put away tools.			26	
26. Clean work area.				
27. Read work order.			2	
28. See eutalloy manual, check with supervisor.			5	Eutalloy manual
29. See powder manual, check with supervisor.			6	
30. Undercut to appropriate depth.			10	Factory rep., Eutalloy manual
31. Increase flame temperature--readjust powder flow.			18	
32. Remove defective hardface.			4	

TASK ANALYSIS GUIDE

I. Task Statement: HARDFACE SURFACE AREA ON CAST IRON WITH EUTALLOY SPRAY PROCESS.

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	28		
2. Read the print.			3	
3. Obtain the metal which is to be hardfaced.			4	
4. Are the service requirements for the hardfacing known?	5	29		Specifications on Print-Hardness Etc.
5. Can the correct powder for the operation be selected	6	30		Eutalloy Spray chart Factory Rep.
6. Obtain the correct powder to be sprayed			7	
7. Clean surface area to be hardfaced.			8	
8. Does surface area need to be undercut?	9	11		
9. Put on safety equipment.			10	
10. Undercut base metal to correct depth.			11	Lathe-Mill shaper-grinder
11. Does weldment need to be turned during welding operation?	12	14		
12. Mount in lathe or turning machine.			13	Check with Field Rep.
13. Set to suitable R.P.M.			14	
14. Put on welding gear.			15	
15. Set up tanks and eutalloy equipment to spray.			16	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Preheat to suitable spraying temperature			17	Eutalloy or Eutectic procedure chart
17. Begin applying hardfacing powder			18	
18. Is the powder wetting out evenly or appearing glassy?	19	31		
19. Complete hardface build up.			20	
20. Fuse areas to base metal that appears to be flakey.			21	
21. Does surface need to be machined?	22	24		
22. Machine surface to correct size			23	
23. Does surface area meet specifications?	24			
24. Shut down equipment.			25	
25. Disconnect and put away eutalloy spray outfit.			26	
26. Put away tools			27	
27. Clean up work area			E.O.T.	
28. Read the work order			2	
29. Check with supervisor, read eutalloy spray chart			5	
30. Check with supervisor or eutalloy spray chart			6	spray chart, factory rep.
31. Increase flame temperature and slow down powder deposition.			32	
32. Check for proper distance from work to tip.			19	

TASK ANALYSIS GIDE

I. Task Statement: **S.M.A.W. HARD SURFACE CARBON STEEL.**

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	23		
2. Read the print			3	
3. Obtain the carbon steel which is to be hardsurfaced.			4	
4. Is the type and size of electrode known?	5	24		Hardfacing guide Electrode chart
5. Set up the SMAW equipment.			6	
6. Determine the welding location and position.			7	
7. Put on safety clothing and welding gear			8	Gloves, Helmet, Glasses, Hard Toed Shoes, Long Sleeved Shirt, Safety Glasses
8. Is preheating Needed?	9	9		
9. Clean the surface to be hardsurfaced.			10	
10. Determine the extent of hardsurfacing to be done			11	
11. Determine the size of weld.			12	
12. Will more than one layer of weld be necessary?	13	13		
13. Preheat the carbon steel to the correct temperature.			14	Preheat calculator for carbon steel.
14. Begin hardsurfacing.			15	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
15. Is there a uniform bead structure forming?	16	25		
16. Are the welding variables correct?	17	26		Electrode Angle Speed of travel arc length Amperage.
17. Is the hardsurface deposit to the correct specifications?	18	27		Print (Size of weld)
18. Does the weld deposit require post heating?	19	20		
19. Apply post heat to weldment			20	
20. Turn off equipment			21	
21. Put up tools			22	
22. Clean work area			E.O.T.	
23. Read the work order			2	
24. Read hardfacing guide, check with supervisor.			5	
25. Correct the welding technique.			16	
26. Correct the welding variables			17	
27. Remove defective hardsurface weld deposit			9	

TASK ANALYSIS GUIDE

I. Task Statement: SMAW CUT METAL WITH (OXYGENLESS) CUTTING ELECTRODE.

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	21		
2. Read the print.			3	
3. Obtain the metal to be cut.			4	
4. Mark where metal is to be cut.			5	
5. Obtain the needed oxygenless cutting electrodes.			6	Size. See arc cutting "Welding Encyclopedia."
6. Can work be positioned?	7	22		
7. Position metal so that cut can be made vertically.			8	
8. Clear work area of any fire or explosion hazzards.			9	
9. Put on safety equipment and arc cutting gear.			10	
10. Set up arc welding/cutting power source.			11	
11. If direct current power, set machine for straight polarity.			12	Recommended Amperage cutting chart.
12. Place electrode into electrode holder.			13	
13. Turn on power.			14	
14. Begin cutting.			15	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
15. Is molten metal flowing away from arc?	16	23		
16. Is arc cutting sufficiently?	17	24		
17. Finish cutting metal.			18	
18. Turn off power.			19	
19. Put up tools.				
20. Clean work area.			E.O.T.	
21. Read work order.			3	
22. Try to cut in such a way the molten metal can flow away form the arc.			8	
23. Check with supervisor to see if the cutting technique is correct.			16	
24. Increase amperage.			25	
25. Shorten cutting arc.			26	
26. Decrease electrode cutting angle.			17	

TASK ANALYSIS GUIDE

I. Task Statement: S.M.A.W. CUT STAINLESS STEEL.

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	21		
2. Read the print.			3	
3. Obtain the stainless steel to be cut.			4	
4. Mark where metal is to be cut.			5	Oxygenless cutting electrode.
5. Obtain oxygenless cutting electrodes.			6	
6. Can work be positioned?	7	22		
7. Position work so that cut can be made vertically.			8	
8. Clear work area of any fire or explosion hazzards.			9	
9. Put on safety equipment and arc cutting gear.			10	
10. Set up S.M.A.W. cutting power source.			11	Power, heat current, polarity
11. If using direct current machine, set for straight polarity.			12	
12. Place electrode into holder.			13	
13. Turn on power.			14	
14. Begin cutting.			15	
15. Is molten metal flowing away from arc?	16	23		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Is arc cutting sufficiently?	17	24		
17. Finish cutting metal.			18	
18. Turn off power.			19	
19. Put up tools.			20	
20. Clean work area.			E.O.T.	
21. Read the work order.			2	
22. Cut so as to keep molten metal away from arc.			7	
23. See supervisor, check cutting technique.			16	
24. Increase amperage and shorten cutting arc.			25	
25. Lower electrode cutting angle.			17	

TASK ANALYSIS GUIDE

I. Task Statement: S.M.A.W. WORN SURFACE BEFORE APPLYING HARD ALLOY.

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	23		
2. Read the print.			3	
3. Obtain the metal with the worn surface.			4	
4. Is the correct type and size of electrode to use known?	5	24		Hardfacing guide, electrode chart
5. Set up the SMAW equipment.			6	
6. Determine the welding location and position.			7	
7. Put on safety clothing and welding gear.			8	
8. Is preheating needed?	9	9		Preheat calculator
9. Prepare surface to be built up.			10	
10. Determine the extent of build-up to be done.			11	
11. Determine the size of bead structure.			12	
12. Will more than one layer of weld be necessary?	25	13		
13. Preheat the metal to the correct temperature.			14	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
14. Begin padd welding.			15	
15. Is there a uniform bead structure forming?	16	26		
16. Are the welding variables correct?	17	27		
17. Has the worn area been padd welded to the correct heighth?	18	28		
18. Does the padd weld require post heating?	19	20		
19. Apply post heat to padd weld.			20	
20. Turn off equipment.			21	
21. Put up tools.			22	
22. Clean up area.			E.O.T.	
23. Read the work order.			2	
24. Refer to hardface guide and check with supervisor.			5	
25. You need to know how many, read print and check with supervisor.			13	
26. Correct the welding technique.			16	
27. Correct the welding variables.			17	
28. Lay weld beads until the correct heighth is obtained.			18	

TASK ANALYSIS GUIDE

I. Task Statement: G.T.A.W. SILICON BRONZE COPPER ALLOYS LAPP JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	21		
2. Read the print			3	
3. Obtain the copper alloy with which to make the weld			4	
4. Obtain the correct size silicon bronze filler wire.			5	Tig. welding reference
5. Set up the GTAW equipment			6	
6. Determine the welding position			7	
7. Put on welding clothing and safety gear.			8	
8. Prepare copper alloys for welding			9	
9. Set-up the lapp welding joint			10	
10. Is preheat needed	22	11		
11 Is a welding fixture needed?	23	12		
12. Tack the welding joint			13	
13. Does the joint meet print specifications?	14	24		
14. Determine the extent of welding			15	
15. Determine the size of weld			16	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Begin welding.			17	
17. Is there a uniform weld bead forming?	18	25		
18. Are the welding variables correct?	19	26		
19. Does the weld meet print specs?	20	27		
20. Turn off equipment			E.O.T.	
21. Read the work order			2	
22. Preheat the copper alloy			11	oxy-fuel torch-gas heater etc.
23. Obtain or build welding fixture			12	
24. Break tacks to realign weld joint.			13	
25. Correct welding technique			18	
26. Correct variables			19	
27. Remove defective weld			28	
28. Reweld defective area.			19	

TASK ANALYSIS GUIDE

I. Task Statement: **G.T.A.W. HARDFACE EDGES ON TOOL STEEL**

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	20		
2. Read the drawing.			3	
3. Determine tool steel hardfacing wire to use.			4	Tool Spec. Sheet
4. Obtain the correct hardfacing wire.			5	
5. Obtain tool steel to be welded.			6	
6. Determine the welding position.			7	
7. Put on welding clothes and safety gear.			8	
8. Prepare tool steel for welding.			9	
9. Do you need a fixture?	21	10		
10. Set up edges to be hardfaced.			11	
11. Preheat edges.			12	
12. Determine the extent of welding.			13	
13. Determine build up and number of passes needed.			14	
14. Begin hardfacing.			15	
15. Is there a uniform bead structure forming?	16	22		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Are the welding variables correct?	17	23		
17. Turn off equipment.			18	
18. Cool weld deposit slowly.	19			
19. Does the weld meet hardness and impact specs?	E.O.T.	24		
20. Read work order.			2	
21. Locate or build welding fixture.			10	
22. Correct welding technique.			16	
23. Correct incorrect welding variables.			17	
24. Remove weld deposits.			25	
25. Correct hardfacing wire.			26	
26. Reweld defective area.			27	
27. Recheck hardness and impact.			19	

TASK ANALYSIS GUIDE

I. Task Statement: S.M.A.W. PREPARE BASE METAL WITH CHAMFERTRODE.

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	20		
2. Read the print.			3	
3. Obtain the metal to be prepared.			4	
4. Mark where metal is to be cut.			5	
5. Obtain correct size of chamfertrodes.			6	Eutectic Electrode chart
6. Can work be positioned?	7	21		
7. Position so that work is flat.			8	
8. Clear work area of any fire or explosion hazzards.			9	
9. Put on safety equipment and welding gear.			10	
10. Set up SMAW power source.			11	
11. If direct current, machine set for straight polarity.			12	
12. Place chamfertrode in holder.			13	
13. Turn on power.			14	
14. Begin cutting.			15	
15. Is metal flowing away from arc?	16	22		
16. Finish cutting.			17	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Turn off power.			18	
18. Put up tools.			19	
19. Clean work area.			E.O.T.	
20. Read work order.			2	
21. Try to maintain arc away from molten pool.			8	
22. Increase amperage.			23	
23. Lower electrode angle.			16	

TASK ANALYSIS GUIDE

I. Task Statement: G.T.A.W. SILICON BRONZE ALLOYS BUTT JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	21		
2. Read the print.			3	blueprint
3. Obtain the bronze alloys with which to make the weld.			4	
4. Obtain the silicon bronze wire.			5	chart filler wire
5. Set up the G.T.A.W. equipment.			6	TIG manual
6. Determine the welding position.			7	
7. Put on safety clothing and welding gear.			8	
8. Prepare bronze for welding.			9	
9. Set up the weld joint.			10	
10. Is preheat needed?	22	11		Pre-heat indicator
11. Tack joint together.			12	
12. Does the joint meet print specs?	13	23		
13. Determine extent of welding needed.			14	
14. Determine penetration needed.			15	
15. Determine the size of weld.			16	
16. Begin welding.			17	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Is there a uniform weld forming?	18	24		
18. Are the welding variables correct?	19	25		
19. Does the weld meet print specs?	20	26		
20. Turn off equipment.			E.O.T.	
21. Read the work order.			2	
22. Preheat the copper joint.			11	Oxy-acetylene, propane, natural gas burner
23. Correct the weld joint.			13	
24. Correct the welding technique.			18	
25. Correct the welding variables.			19	
26. Correct to meet specs.			20	

TASK ANALYSIS GUIDE

I. Task Statement: S.M.A.W. CAST IRON BUTT JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	25		
2. Read the print.			3	
3. Obtain the cast iron with which to make the weld.			4	
4. Is the type of cast iron known?	5	26		
5. Select a suitable electrode for the specified job.			6	Electrode guide
6. Determine the welding position.			7	
7. Put on safety clothes and welding gear.			8	
8. Prepare the metal for welding.			9	Clean, grind, etc.
9. Is a welding fixture needed?	27	10		
10. Set-up the joint.			11	
11. Tack weld the pieces into correct alignment.			12	
12. Is preheating the iron necessary?	13	14		
13. Preheat the cast iron to the proper preheat.			14	
14. Does the joint meet specifications?	15	28	1	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
15. Determine the correct welding technique.			16	
16. Determine the correct size of the weld to make.			17	
17. Make the weld.			18	
18. Are the welding variables correct?	19	29		
19. Does the weld meet the print specifications?	20	30		
20. Turn off equipment.			21	
21. Does the weldment need post heating?	22	23		
22. Post heat the weldment.			23	
23. Put up tools.			24	
24. Clean up area.			E.O.T.	
25. Read the work order.			2	
26. Identify the type of cast from spark test or see supervisor.			5	Spark test--cast iron text grinder
27. Obtain a weld fixture.			10	
28. Grind out tacks, correct the joint specs and alignment.			15	
29. Correct the welding variables.			19	
30. Remove defective weld area and reweld.			20	

TASK ANALYSIS GUIDE

I. Task Statement: **S.M.A.W. HARDFACE ALLOY STEEL.**

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	23		
2. Read the print.			3	Blueprint
3. Obtain the alloy steel which needs hard-faced.			4	
4. Is the size and type of hardfacing electrode to use known?	5	24		Hardfacing guide
5. Set up the SMAW equipment.			6	Equipment handbook
6. Determine the welding location and position.			7	
7. Put on safety clothing and welding gear.			8	
8. Is preheating needed?	13	9		Preheat calculator for alloy steel.
9. Clean the surface to be hardfaced.			10	
10. Determine the extent of hardfacing to be done.			11	Print specs.
11. Determine the size of weld.			12	print specs.
12. Will more than one layer of weld be necessary?	13			
13. Preheat the alloy to the correct temperature.			14	Oxy-fuel torch, preheat oven. Temp stix

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
14. Begin hardfacing.			15	
15. Is there a uniform bead structure forming?	16	25		
16. Are the welding variables correct?	17	26		
17. Is the hardface deposit to the correct specifications?	18	27		
18. Does the weld deposit require post heating?	19	20		
19. Apply post heat to weldment.				Post heat chart for alloy steels
20. Turn off equipment.			21	
21. Put up tools.			22	
22. Clean work area.			E.O.T	Brooms, dust pans
23. Read the work order.			2	
24. Read hardfacing guide, check with supervisor.			5	
25. Correct welding technique.			16	
26. Correct welding variables.			17	
27. Remove defective hardfacing weld deposit.			9	

TASKS BY RUSTY LYNDE

The following section contains the tasks written by Rusty Lynde. The tasks are outlined on this sheet. You will find the tasks in this section to be in the order as listed below.

CHECK AND IDENTIFY MATERIALS
CUT METAL WITH OXY-FUEL HAND TORCH
OXY-FUEL CUT WORN OR DAMAGED PIECES FROM STRUCTURAL MEMBERS
OXY-FUEL BRAZE CARBON STEEL TEE JOINT
OXY-FUEL BRAZE CARBON STEEL BUTT JOINT
OXY-FUEL CUT SCRAP STRUCTURAL STEEL
OXY-FUEL BRAZE CARBON STEEL CORNER JOINT
OXY-FUEL BRAZE CARBON STEEL BUTT JOINT
OXY-FUEL WELD CAST IRON BUTT JOINT
OXY-FUEL WELD CAST IRON CORNER JOINT
OXY-FUEL WELD CAST IRON LAP JOINT
OXY-FUEL/TRACK CUT SHEET STOCKS
OXY-FUEL BRAZE CARBON STEEL EDGE JOINT
CUT METAL WITH RADIO-GRAPH OXY-FUEL CUTTER
OXY-FUEL BRAZE COPPER TEE JOINT
OXY-FUEL BRAZE COPPER BUTT JOINT
OXY-FUEL BRAZE COPPER LAP JOINT
BRAZE STEEL TO BRASS BUTT JOINT
BRAZE STEEL TO BRASS LAP JOINT
OXY-FUEL BRAZE COPPER CORNER JOINT
HARD FACE ALLOY STEEL WITH OXY-ACETYLENE PROCESS
OXY-ACETYLENE HARD SURFACING ON CAST IRON
BRAZE COPPER TO STEEL LAP JOINT
COPPER ALLOY BRAZE CAST IRON TEE JOINT
COPPER ALLOY BRAZE CAST IRON LAP JOINT
COPPER ALLOY BRAZE CAST IRON BUTT JOINT
BRAZE COPPER TO STEEL LAP JOINT
BRAZE COPPER TO STEEL BUTT JOINT
COPPER ALLOY BRAZE COPPER ALLOY CORNER JOINT
COPPER ALLOY BRAZE COPPER ALLOY TEE JOINT
COPPER ALLOY BRAZE COPPER ALLOY LAP JOINT
COPPER ALLOY BRAZE COPPER ALLOY BUTT JOINT

TASK ANALYSIS GUIDE

I. Task Statement:

CHECK AND IDENTIFY MATERIALS

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	41		
2. Are blueprints used?	3	4		
3. Read blueprints.			4	Blueprints
4. Locate material to be identified.			5	
5. Can material be identified by part number, ASTM or ASME number or Color Code?	40	6		Color Code, ASTM or ASME Code Book
6. Obtain a piece of material to test.			7	
7. Perform an appearance test.			8	
8. Look at shape of part.			9	
9. Measure part.			10	Measuring tools
10. Do measurements and appearance agree with specifications?	40	11		ASTM - ASME Codes Blueprints, Color Codes
11. Could a weight test identify material?	12	15		
12. Obtain weight scales.			13	Weight scales
13. Weight material.			14	
14. Does weight conform to specifications?	40	15		
15. Could a magnet test identify material?	16	19		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Obtain a magnet.			17	Magnet
17. Place magnet on material.			18	
18. Does magnet test identify material?	40	19		
19. Could a grinding spark test identify material?	20	25		
20. Obtain a grinder.			21	Grinder
21. Secure metal for grinding.			22	Clamping tools
22. Put on safety clothing and gear.			23	Safety glasses, shield, gloves
23. Grind metal.			24	
24. Do sparks from grinding identify material?	40	25		"Welding Technology"
25. Could a chip test identify material?	26	30		
26. Obtain hammer and chisel.			27	Hammer & chisel
27. Secure material for chip test.			28	Clamping tools
28. Chip off piece of metal.			29	
29. Does chip from material identify types of material?	40	30		
30. Could a torch test identify material?	31	42		
31. Set up oxy-fuel cutting equipment.			32	Instruction manual, Oxy-fuel cutting tools
32. Set oxygen and fuel pressure.			33	"The Oxy-Acetylene Hand Book"
33. Secure metal for cutting.			34	Clamping tools
34. Is work area hazard free?	35	44		I.O.S.H.A.
35. Put on safety clothing and cutting gear.			36	Safety glasses, gloves, leathers, cutting goggles

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
36. Ignite oxy-fuel cutting torch.			37	Striker
37. Check flame parameters.			38	"The Welder's Hand Book"
38. Try to Cut metal with torch.			39	"General Welding"
39. Do torch test results identify material?	40	45		
40. Mark material identified.			E.O.T.	Marking tools
41. Read work order.			2	Work order
42. Ship material to laboratory for tests.			43	Tow motor/truck
43. Obtain results from laboratory.			40	
44. Make work area hazard free			35	
45. Mark material rejected.			40	Marking tools

TASK ANALYSIS GUIDE

I. Task Statement:

CUT METAL WITH OXY-FUEL HAND TORCH

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	20		
2. Is work done from blueprint?	3	4		
3. Read blueprint.			4	Blueprint
4. Determine thickness, size and shape of metal to be cut.			5	Measuring tool
5. Mark metal where cut is to be made.			6	Soap stone, marker, center punch & hammer
6. Set up oxy-fuel equipment.			7	Instructor's manual
7. Select cutting torch head & tip.			8	Manufacturer's tip reference charts
8. Set oxygen pressure.			9	"The Oxy-Acetylene Hand Bock"
9. Set fuel pressure.			10	"General Welding"
10. Is work area hazard free?	11	21		"Welding Technology"
11. Is part in position for cutting?	12	22		
12. Put on safety equipment & cutting gear.			13	Safety glasses, gloves, leathers, cutting goggles
13. Ignite oxy-fuel cutting equipment,			14	Striker
14. Check cutting flame parameters.			15	
15. Begin cutting operation.			16	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Are cutting variables to specifications?	17	23		
17. Complete cutting operation.			18	
18. Does finished cut meet specifications?	19	24		
19. Shut down oxy-fuel cutting equipment.			E.O.T.	
20. Read written work order.			2	Written work order
21. Make area hazard free.			11	
22. Position part for cutting.			12	Positioning tools
23. Correct cutting variables.			17	
24. Remark cut to specifications.			19	

TASK ANALYSIS GUIDE

I. Task Statement:

OXY-FUEL CUT WORN OR DAMAGED PIECES FROM STRUCTURAL MEMBERS

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	17		
2. Determine thickness, size and shape of metal to be cut.			3	Measuring tools
3. Select cutting torch, head and tip.			4	Manufaturer's Reference
4. Set up oxy-fuel equipment.			5	Instruction Manual
5. Set oxygen pressure.			6	"The Oxy-Acetylene Hand Book"
6. Set fuel pressure.			7	"General Welding"
7. Is work area free from hazards?	8	18		"The Welder's Hand Book"
8. Put on safety clothing & cutting gear.			9	Safety glasses, gloves, leather, cutting goggles
9. Determine extent of cut.			10	
10. Position metal for cutting.			11	Positioning tools
11. Ignite oxy-fuel cutting equipment.			12	Striker
12. Check flame parameters.			13	"Welding Technology"
13. Begin cutting operation.			14	
14. Are cutting variables to specifications?	15	19		
15. Complete cutting operations.			16	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Shut down oxy-fuel cutting equipment.			E.O.T.	
17. Read written work order.			2	Written work order
18. Make work area hazard free.			8	
19. Correct cutting variables.			15	

TASK ANALYSIS GUIDE

I. Task Statement:

OXY-FUEL BRAZE CARBON STEEL TEE JOINT.

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	34		
2. Is work done from blueprint?	35	3		
3. Obtain pieces of carbon steel.			4	
4. Determine thickness of steel.			5	Measuring tools
5. Obtain brazing filler wire.			6	AWS A5.8 ASTM B260
6. Is filler wire flux coated?	8	7		
7. Obtain flux for brazing wire.			8	Manufacturer's Refer.
8. Select tip for brazing torch.			9	Manufacturer's Refer.
9. Set up oxy-fuel equipment.			10	Instruction manual
10. Set oxygen pressure.			11	The Oxy-Acetylene Hand Book
11. Set fuel pressure.			12	"General Welding"
12. Is work area hazard free?	13	36		I.O.S.H.A.
13. Put on safety clothing and brazing gear.			14	Safety glasses, gloves leather, brazing shield
14. Prepare steel surfaces for brazing.			15	Sander, files, wire brush, chemical
15. Does steel need to be beveled?	16	17		"Welding Technology"
16. Bevel steel pieces.			17	Radiograph, Grinder cutting torch

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Secure steel into tee joint.			18	Clamping tools
18. Position tee joint.			19	Positioning tools
19. Does tee joint meet specifications?	20	37		Blueprint or code
20. Ignite oxy-fuel brazing torch.			21	Striker
21. Check flame parameters.			22	"The Welder's Hand Book"
22. Does joint need to be preheated?	23	24		
23. Preheat tee joint with brazing torch.			24	
24. Preheat brazing wire with brazing torch.			25	
25. Apply flux to preheated brazing wire.			26	
26. Does joint need to be tack brazed?	27	28		
27. Tack braze tee joint.			28	
28. Begin brazing tee joint.			29	
29. Are all brazing variables correct?	30	38		
30. Finish brazing tee joint.			31	
31. Clean flux off of tee joint.			32	Sander, grinder, file, wire brush
32. Does finished joint meet specifications?	33	39		Blueprint
33. Shut down oxy-fuel equipment.			E.O.T.	
34. Read work order.			2	Work order
35. Read blueprint.			3	Blueprint
36. Make work area hazard free.			13	
37. Realign tee joint to specifications.			20	
38. Correct improper brazing variables.			30	
39. Remove defective braze.			40	Sander, grinder, file

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
40. Rebraze defective joint area.			33	

TASK ANALYSIS GUIDE

I. Task Statement: OXY FUEL BRAZE CARBON STEEL BUTT JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	34		
2. Is work done from blueprint?	35	3		
3. Obtain pieces of carbon steel.			4	
4. Determine thickness of carbon steel.			5	Measuring Tools
5. Obtain brazing filler wire.			6	AWS A5.8 ASTM B260
6. Is filler wire flux coated?	8	7		
7. Obtain flux for brazing wire.			8	Manufacturer's Refer.
8. Select tip for brazing torch.			9	Manufacturer's Refer.
9. Set up oxy-fuel equipment.			10	Instruction Manual
10. Set oxygen pressure.			11	"The Oxy-Acetylene Hand Book"
11. Set fuel pressure.			12	"General Welding"
12. Is work area hazard free?	13	36		I.O.S.H.A.
13. Put on safety clothing and brazing gear.			14	Safety glasses, gloves, leathers, brazing shield
14. Prepare steel surfaces for brazing.			15	Sander, files, wire brush chemicals
15. Does steel need to be beveled?	16	17		"Welding Technology"

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Bevel carbon steel pieces.			17	Radio graph Grinder cutting torch
17. Secure steel into butt joint.			18	Clamping tools
18. Position carbon steel butt joint.			19	Positioning tools
19. Does butt joint meet specifications?	20	37		Blueprint or code
20. Ignite oxy-fuel brazing torch.			21	Striker
21. Check flame parameters.			22	"The Welders Hand Book"
22. Does joint need to be preheated?	23	24		
23. Preheat butt joint with brazing torch.			24	
24. Preheat brazing wire with brazing torch.			25	
25. Apply flux to preheated brazing wire.			26	
26. Does joint need to be tack brazed?	27	28		
27. Tack braze butt joint.			28	
28. Begin brazing butt joint.			29	
29. Are all brazing variables correct?	30	38		
30. Finish brazing butt joint.			31	
31. Clean flux off of butt joint.			32	Sander, grinder, file, wire brush, chemical
32. Does finished joint meet specifications?	33	39		Blueprint
33. Shut down oxy-fuel equipment.			E.O.T.	
34. Read work order.			2	work order
35. Read blueprint.			3	Blueprint
36. Make work area hazard free.			13	
37. Realign butt joint to specifications			20	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
38. Correct improper brazing variables.			30	
39. Remove defective braze.			40	Sander, grinder, file
40. Rebraze defective joint area.			33	

TASK ANALYSIS GUIDE

I. Task Statement:

OXY-FUEL BRAZE CARBON STEEL LAP JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	32		
2. Is work done from blueprint?	33	3		
3. Obtain pieces of carbon steel.			4	
4. Determine thickness of steel.			5	Measuring tools
5. Obtain brazing filler wire.			6	AWS A5.8 B260
6. Is filler wire flux coated?	8	7		
7. Obtain flux for brazing wire.			8	Manufacturer's Refer.
8. Select tip for brazing torch.			9	Manufacturer's Refer.
9. Set up oxy-fuel equipment.			10	Instruction Manual
10. Set oxygen pressure.			11	"The Oxy-Acetylene Hand Book"
11. Set fuel pressure.			12	General Welding
12. Is work area hazard free?	13	34		I.O.S.H.A.
13. Put on safety clothing and brazing gear.			14	Safety glasses, gloves leathers, brazing shield
14. Prepare steel surfaces for brazing.			15	Sander, grinder, file wire brush, Chemical
15. Secure steel into lap joint.			16	Clamping tools

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Position lap joint.			17	Positioning tools
17. Does lap joint meet specifications?	18	35		Blueprint
18. Ignite oxy-fuel brazing torch.			19	Striker
19. Check flame parameters.			20	"Welding Technology"
20. Does joint need to be preheated?	21	22		"The Welder's Hand Book"
21. Preheat lap joint with brazing torch.			22	
22. Preheat brazing wire with torch.			23	
23. Apply flux to preheated brazing wire.			24	
24. Does lap joint need to be tack brazed?	25	26		
25. Tack braze lap joint.			26	
26. Begin brazing lap joint.			27	
27. Are brazing variables correct?	28	36		
28. Finish brazing lap joint.			29	
29. Clean flux off of lap joint.			30	Chemicals
30. Does finished joint meet specifications?	31	37		
31. Shut down oxy-fuel equipment.			E.O.T.	
32. Read work order.			2	Work Order
33. Read blueprint.			3	Blueprint
34. Make work area hazard free.			13	
35. Realign lap joint to specifications.			18	
36. Correct improper brazing variables.			28	
37. Remove defective braze.			38	Grinder, sander
38. Rebraze defective braze area.			31	

TASK ANALYSIS GUIDE

I. Task Statement:
OXY-FUEL CUT SCRAP STRUCTURAL STEEL

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	23		
2. Is work done from blueprint?	24	3		
3. Determine thickness, shape and size of scrap structural steel.			4	Meausuring tools tape measure, ruler
4. Select cutting torch, head and tip.			5	Manufacturer's Refer.
5. Set up oxy-fuel equipment.			6	Instruction Manual
6. Set oxygen pressure.			7	"The Oxy-Acetylene Hand Book"
7. Set fuel pressure.			8	"General Welding"
8. Is work area free from hazards?	9	25		I.O.S.H.A.
9. Put on safety clothing and cutting gear.			10	Safety glasses, leathers, gloves, cutting goggles
10. Mark metal where cut is to be made.			11	Soap stone, hammer + punch marking tools, pencil
11. Determine extent of cut.			12	
12. Is a cutting guide needed?	13	14		Cutting guide
13. Set up a cutting guide.			14	
14. Ignite oxy-fuel cutting torch.			15	Striker
15. Check flame parameters.			16	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Is steel to be preheated with cutting torch?	17	18		"Welding Technology"
17. Preheat structural steel with torch.			18	
18. Begin cutting operation.			19	
19. Are all cutting variables correct.	20	26		
20. Finish making cut.			21	
21. Does finished cut meet specifications?	22	27		Blueprint
22. Shut down oxy-fuel equipment.			E.O.T.	
23. Read work order.			2	Work order
24. Read blueprint.			3	Blueprint
25. Make work area hazard free.			9	
26. Correct improper cutting variables.			20	
27. Recut metal to specifications.			22	

TASK ANALYSIS GUIDE

I. Task Statement:

OXY-FUEL BRAZE CARBON STEEL CORNER JOINT.

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	32		
2. Is work done from blueprint?	33	3		
3. Obtain pieces of carbon steel.			4	
4. Determine thickness of steel.			5	Measuring tools
5. Obtain brazing filler wire.			6	AWS A5.8 ASTM B260
6. Is filler wire flux coated?	8	7		
7. Obtain flux for brazing wire.			8	Manufacturer's Refer.
8. Select tip for brazing torch			9	Manufacturer's Refer.
9. Set up oxy-fuel equipment.			10	Instruction Manual
10. Set oxygen pressure.			11	"The Oxy-Acetylene Hand Book"
11. Set fuel pressure.			12	"General Welding"
12. Is work area hazard free?	13	34		I.O.S.H.A.
13. Put on safety clothing and brazing gear.			14	Safety glasses, gloves, leathers, brazing shields
14. Prepare steel surfaces for brazing.			15	Sanders, grinders, file, wire brush, chemicals
15. Secure steel into corner joint.			16	Clamping tools

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Secure cast iron into butt joint.			17	Clamping tools
17. Position butt joint.			18	Positioning tools
18. Does butt joint meet specifications?	19	37		Blueprint or code
19. Is cast iron to be preheated with welding torch?	20	38		"Welding Technology"
20. Ignite oxy-fuel welding torch.			21	"The Welder's Hand Book"
21. Check flame parameters.			22	
22. Preheat cast iron with oxy-fuel torch.			23	
23. Preheat cast rion welding rod for flux.			24	
24. Apply flux to cast iron welding rod.			25	
25. Begin welding butt joint.			26	
26. Are all welding variables correct?	27	39		
27. Finish welding butt joint.			28	
28. Clean up welded butt joint.			29	Wire brush, grinder, file
29. Does finished butt joint meet specs.?	29	40		Blueprint or code
30. Does cast iron need to be post heated?	31	33		
31. Is post heating done with welding torch?	32	42		
32. Post heat cast iron with welding torch.			33	
33. Shut down oxy-fuel equipment.			E.O.T.	
34. Read work order.			2	Work order
35. Read blueprint.			3	Blueprint
36. Make work area hazard free.			12	
37. Realign butt joint to specifications.			19	
38. Preheat cast iron with method available.			20	Furnace, blowpipe, Bed of coke

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
39. Correct welding variables.			27	
40. Remove defective weld metal.			41	Grinder
41. Reweld defective joint area.			29	
42. Post heat with method available.			32	Furnace

TASK ANALYSIS GUIDE

I. Task Statement:

OXY-FUEL WELD CAST IRON BUTT JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	34		
2. Is work done from blueprint?	35	3		
3. Obtain pieces of cast iron.			4	
4. Determine thickness of cast iron.			5	Measuring tools
5. Obtain cast iron welding rod for oxy-fuel welding.			6	Manufacturer's refer.
6. Obtain flux for oxy-fuel welding rod.			7	Manufacturer's refer.
7. Select tip for welding torch.			8	Manufacturer's refer.
8. Set up oxy-fuel welding equipment.			9	Instruction Manuel
9. Set oxygen pressure.			10	"The Oxy-Acetylene Hand Book"
10. Set fuel pressure.			11	"General Welding"
11. Is work area hazard free?	12	36		I.O.S.H.A.
12. Put on safety clothing & welding gear.			13	Safety glasses, gloves, leathers, welding goggles
13. Prepare cast iron for welding.			14	Sander, wire brush, file
14. Does cast iron need it edges beveled?	15	16		
15. Beveled cast iron.			16	Grinder

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Position corner joint.			17	Positioning tools
17. Does corner joint meet specifications?	18	35		Blueprint
18. Ignite oxy-fuel brazing torch.			19	Striker
19. Check flame parameters.			20	Welding Technology
20. Does joint need to be preheated?	21	22		"The Welder's Hand Book"
21. Preheat corner with brazing torch.			22	
22. Preheat brazing wire with torch.			23	
23. Apply flux to preheated brazing wire.			24	
24. Does corner joint need to be tacked?	25	26		
25. Tack braze corner joint.			26	
26. Begin brazing corner joint.			27	
27. Are all brazing variables correct?	28	36		
28. Finish brazing corner joint.			29	
29. Clean flux off of corner joint.			30	Chemicals
30. Does finished joint meet specifications?	31	37		
31. Shut down oxy-fuel equipment.			E.O.T.	
32. Read work order.			2	Work order
33. Read blueprint.			3	Blueprint
34. Make work area hazard free.			13	
35. Realign corner joint specifications.			18	
36. Correct improper brazing variables.			28	
37. Remove defective braze.			38	Grinder, sander
38. Rebraze defective joint area.			31	

TASK ANALYSIS GUIDE

I. Task Statement:

OXY-FUEL WELD CAST IRON CORNER JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	32		
2. Is work done from blueprint?		3		
3. Obtain pieces of cast iron.			4	
4. Determine thickness of cast iron.			5	Measuring tools
5. Obtain cast iron welding rod for oxy-fuel wleding.			6	Manufacturer's refer.
6. Obtain flux for oxy-fuel welding rod.			7	Manufacturer's refer.
7. Select tip for welding torch.			8	Manufacturer's refer.
8. Set up oxy-fuel welding equipment.			9	Instruction Manual
9. Set oxygen pressure.			10	"The Oxy-Acetylene Hand Book"
10. Set fuel pressure.			11	"General Welding"
11. Is work area hazard free?	12	34		I.O.S.H.A.
12. Put on safety clothing & welding gear.			13	Safety glasses, gloves, leathers, welding goggles
13. Prepare cast iron for welding.			14	Sander, grinder, file, wire brush
14. Secure cast iron into corner joint.			15	Clamping tools

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
15. Position corner joint.			16	Positioning tools
16. Does corner joint meet specification?	17	35		Blueprint or code
17. Is cast iron to be preheated with welding torch?	18	36		"The Welder's Hand Book"
18. Ignite oxy-fuel welding torch.			19	Striker
19. Check flame parameters.			20	"Welding Technology"
20. Preheat cast iron with oxy-fuel torch			21	
21. Preheat cast iron rod for flux.			22	
22. Apply flux to cast iron rod.			23	
23. Begin welding corner joint.			24	
24. Are all welding variables correct?	25	37		
25. Finish welding variables joint.			26	
26. Clean up welded corner joint.			27	Grinder
27. Does finished corner joint meet spec?	28	38		Blueprint
28. Does cooling of cast iron need to be controlled?	29	31		
29. Is cooling to be controlled with welding torch?	30	40		
30. Control cooling with welding torch.			31	
31. Shut down oxy-fuel equipment.			E.O.T.	
32. Read work order.			2	Work order
33. Read blueprint.			3	Blueprint
34. Make work area hazard free.			12	
35. Realign corner joint to specs.			17	
36. Preheat cast iron with method available.			18	Furnace, blowpipe, Bed of coke

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
37. Correct welding variables.			25	
38. Remove defective weld material.			39	Grinder
39. Reweld defective joint area.			28	
40. Post heat cast iron with method available.			30	Furnace

TASK ANALYSIS GUIDE

I. Task Statement:

OXY-FUEL WELD CAST IRON LAP JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	32		
2. Is work done from blueprint?	33	3		
3. Obtain pieces fo cast iron.			4	
4. Determine thickness of cast iron.			5	Measuring tools
5. Obtain cast iron filler wire.			6	Manufacturer's refer.
6. Obtain flux for cast iron rod.			7	Manufacturer's refer.
7. Select tip for welding torch.			8	Manufacturer's refer.
8. Set up oxy-fuel welding equipment.			9	Instruction Manual
9. Set oxygen pressure.			10	"The Oxy-Acetylene Hand Book"
10. Set fuel pressure.			11	"General Welding"
11. Is work area hazard free?	12	34		I.O.S.H.A.
12. Put on safety clothing & welding gear.			13	Safety glasses, gloves, leathers, welding shield
13. Prepare cast iron for welding.			14	Sander, grinder, file, wire brush
14. Secure cast iron into lap joint.			15	Clamping tools
15. Position cast iron lap joint.			16	Positioning tools

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Does lap joint meet specifications?	17	35		Blueprint or code
17. Is cast iron to be preheated with torch?	18	36		
18. Ignite oxy-fuel welding torch.			19	Striker
19. Check flame parameters.			20	"Welding Technology"
20. Preheat cast iron with oxy-fuel torch.			21	
21. Preheat cast iron rod for flux.			22	
22. Apply flux to cast iron rod.			23	
23. Begin welding lap joint.			24	
24. Are all welding variables correct?	25	37		
25. Finish welding lap joint.			26	
26. Clean welded lap joint.			27	
27. Does finished lap joint meet specs.?	28	38		
28. Does cooling of cast iron need to be controlled?	29	31		
29. Is cooling to be controlled with welding torch?	30	40		
30. Control cooling with welding torch.			31	
31. Shut down oxy-fuel equipment.			E.O.T.	
32. Read work order.			2	Work order
33. Read blueprint.			3	Blueprint
34. Make work area hazard free.			12	
35. Realign lap joint to specifications.			17	
36. Preheat cast iron with method available.			18	Furnace, blowpipe, Bed of coke
37. Correct welding variables.			25	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
38. Remove defective weld material.			39	Grinder
39. Reweld defective joint area.			28	
40. Control cooling with method available			30	Furnace

TASK ANALYSIS GUIDE

I. Task Statement:

OXY-FUEL TRACK CUT SHEET STOCK

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	25		
2. Is work done from blueprint?	26	3		
3. Determine thickness of sheet stock.			4	Measuring tools
4. Is it a multiple sheet cut?	5	7		
5. Clamp sheet stock together?			6	Clamping tools
6. Is sheet stock to be tacked together?	27	7		
7. Mark where metal is to be cut.			8	Marking tools scribe, paint
8. Postion sheet stock for cutting.			9	Positioning tools towmotor, crane
9. Put together track for cutter.			10	Wrenches, Screw drivers Instruction Manual
10. Select tip for cutting head.			11	Manufacturer's tip Reference Chart
11. Set up oxy-fuel cutting equipment.			12	Instruction Manual
12. Set up cutting head and track rollers.			13	"The Oxy-Acetylene Hand Book"
13. Set oxygen pressure.			14	"General Welding"
14. Set fuel pressure.			15	"The Welders Hand Book"
15. Is work area free from hazards?	16	28		O.S.H.A.

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Put on safety clothing and cutting gear.			17	Safety glasses, gloves, leathers, cutting goggles
17. Ignite oxy-fuel cutting torch.			18	Striker
18. Check flame parameters.			19	
19. Begin cutting operation.			20	"Welding Technology"
20. Are all cutting variables correct?	21	29		
21. Finish cutting operation.			22	
22. Does finished cut conform to specs.?	23	30		
23. Shut down oxy-fuel cutting equipment.			24	
24. Remove track from sheet stock.			E.O.T.	
25. Read written work order.			2	Written work order
26. Read blueprint.			3	Blueprint
27. Tack metal together.			7	
28. Make work area hazard free.			16	
29. Correct cutting variables.			21	
30. Remake cut on sheet stock.			23	

TASK ANALYSIS GUIDE

I. Task Statement:

OXY-FUEL BRAZE CARBON STEEL EDGE JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	32		
2. Is work done from blueprint?	33	3		
3. Obtain carbon steel pieces.			4	
4. Determine thickness of steel.			5	Measuring tools
5. Obtain brazing filler wire.			6	AWS A5.8 ASTM B260
6. Is filler wire flux coated?	8	7		
7. Obtain flux for brazing filler wire.			8	Manufacturer's Refer.
8. Select tip for brazing torch.			9	Manufacturer's Refer.
9. Set up oxy-fuel equipment.			10	Instruction Manual
10. Set oxygen pressure.			11	"The Oxy-Acetylene Hand Book"
11. Set fuel pressure.			12	General Welding
12. Is work area hazard free?	13	34		I.O.S.H.A.
13. Put on safety clothing and brazing gear.			14	Safety glasses, gloves leathers, brazing shield
14. Prepare surfaces for brazing.			15	Sander, grinder, file wire brush, chemicals
15. Secure parts into edge joint.			16	Clamping tools

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Position edge joint.			17	Positioning tools
17. Does joint meet specifications?	18	35		Blueprint
18. Ignite oxy-fuel brazing torch.			19	Striker
19. Check flame parameters.			20	"Welding Technology"
20. Does joint need preheated?	21	22		"The Welder's Hand Book"
21. Preheat edge joint with brazing torch.			22	
22. Preheat brazing wire with torch.			23	
23. Apply flux to preheated brazing wire.			24	
24. Does edge joint need to be tack brazed?	25	26		
25. Tack braze edge joint.			26	
26. Begin brazing edge joint.			27	
27. Are all brazing variables correct?	28	36		
28. Finish brazing edge joint.			29	
29. Clean flux off of edge joint.			30	Chemical
30. Does finished joint meet specifications?	31	37		
31. Shut down oxy-fuel equipment.			E.O.T.	
32. Read work order.			2	Work order
33. Read blueprint.			3	Blueprint
34. Make work area hazard free.			13	
35. Realign edge joint to specifications.			18	
36. Correct improper brazing variables.			28	
37. Remove defective braze.			38	Grinder
38. Rebraze defective braze joint area.			31	

TASK ANALYSIS GUIDE

I. Task Statement:

CUT METAL WITH RADIO-GRAPH OXY-FUEL CUTTER.

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	26		
2. Is work done from blueprint?	27	3		
3. Determine thickness of metal to be cut.			4	Rule, tape, Measuring tools
4. Is more than one piece of metal to be cut at one time?	5	7		
5. Clamp metal together.			6	Clamping tools
6. Is metal to be tacked together?	28	7		
7. Mark where metal is to be cut.			8	Scribe, soap stone, Marking pen pencil
8. Position metal for cutting.			9	Crone, towmotor, Positioning tools
9. Does radio-graph track need assembled?	29	10		"General Welding"
10. Is more than one cutting head used?	11	12		Manufacturer's Reference
11. Obtain extra cutting heads.			12	
12. Select tips for cutting heads.			13	"The Oxy-Acetylene Hand Book"
13. Set up radio-graph oxy-fuel cutting equipment.			14	Instruction Manual
14. Set oxygen pressure.			15	"The Welder's Hand Book"
15. Set fuel pressure.			16	"Welding Technology"
16. Is work area hazard free?	17	30		O.S.H.A.

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Put on safety clothing and cutting gear.			18	Leathers, cutting goggles, safety glasses, gloves
18. Ignite oxy-fuel cutting tips			19	Striker
19. Check flame parameters.			20	
20. Begin cutting operation.			21	
21. Set radio-graph cutting speed.			22	
22. Are all cutting variables correct?	23	31		
23. Finish cutting operation.			24	
24. Does finished cut conform to spec.?	25	32		
25. Shut down radio-graph oxy-fuel cutting equipment.			E.O.T.	
26. Read written work order.			2	Written Work order
27. Read blueprint			3	Blueprint
28. Tack metal together.			7	Electric Welder
29. Assemble track for radio-graph.			10	Wrenches screwdrivers
30. Make work area hazard free.			17	
31. Correct cutting variables.			23	
32. Remake cut on metal.			25	

TASK ANALYSIS GUIDE

I. Task Statement: OXY-FUEL BRAZE COPPER TEE JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	31		
2. Is work done from blueprint?	32	3		
3. Obtain pieces of copper			4	
4. Determine thickness of copper			5	Measuring tools
5. Obtain brazing filler wire			6	AWS A5.8 ASTM B260
6. Is filler wire flux coated?	8	7		
7. Obtain flux for brazing wire			8	Manufacturer's reference
8. Select brazing torch tip			9	"General Welding"
9. Set up oxy-fuel brazing equipment			10	Instruction Manual
10. Set oxygen pressure			11	"Welding Technology"
11. Set fuel pressure			12	"The Oxy-Acetylene Handbook"
12. Is work area hazard free?	13	33		O.S.H.A.
13. Put on safety clothing and brazing gear			14	Safety glasses, gloves, leathers, goggles
14. Prepare copper surfaces for brazing			15	Sander, grinder, file wire brushs chemical
15. Secure parts into tee joint			16	Clamping tools
16. Position tee joint			17	Positioning tools
17. Does tee joint meet specifications?	18	34		Blueprint or code

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
18. Ignite Oxy-fuel brazing torch			19	Striker
19. Check flame parameters			20	
20. Preheat brazing wire for flux			21	"The Welder's Handbook"
21. Apply flux to preheated brazing wire			22	
22. Preheat copper to brazing temperature			23	
23. Does tee joint need to be tack brazed?	24	25		
24. Tack braze tee joint			25	
25. Begin brazing tee joint			26	
26. Are all brazing variables correct?	27	35		
27. Finish brazing tee joint			28	
28. Clean up brazed joint			29	Grinder, sander, file wire brush, chemical
29. Does finished tee joint meet specifications?	30	36		
30. Shut down oxy-fuel equipment			EOT	
31. Read work order			2	Work order
32. Read blueprint			3	Blueprint
33. Make work area hazard free			13	
34. Realign tee joint to specifications			18	
35. Correct brazing variables			27	
36. Remove defective braze from joint			37	Grinder
37. Re-braze defective joint area			30	

TASK ANALYSIS GUIDE

I. Task Statement:

OXY-FUEL BRAZE COPPER BUTT JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	31		
2. Is work done from blueprint?	32	3		
3. Obtain pieces of copper.			4	
4. Determine thickness of copper.			5	Measuring tools
5. Obtain brazing filler wire.			6	AWS A5.8 ASTM B260
6. Is filler wire flux coated?	8	7		
7. Obtain flux for brazing wire.			8	Manufacturer's Refer.
8. Select tip for brazing torch.			9	"General Welding"
9. Set up oxy-fuel brazing equipment.			10	Instruction Manual
10. Set oxygen pressure.			11	"The Oxy-Acetylene Hand Book"
11. Set fuel pressure.			12	"Welding Technology"
12. Is work area hazard free?	13	33		O.S.H.A.
13. Put on safety clothing & brazing gear.			14	Safety glasses, gloves, leathers, goggles
14. Prepare copper surfaces for brazing.			15	Sanders, wire brush, file, chemicals
15. Do copper surfaces need to be beveled?	16	17		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Bevel edges of copper to specifications.			17	Grinders
17. Secure parts into butt joint.			18	Clamping tools
18. Position copper butt joint.			19	Positioning tools
19. Does butt joint meet specifications?	20	34		
20. Ignite oxy-fuel brazing torch.			21	Striker
21. Check flame parameters.			22	
22. Preheat brazing wire for flux.			23	
23. Apply flux to preheated brazing.			24	
24. Preheat copper to brazing temp.			25	
25. Begin brazing butt joint.			26	
26. Are all brazing variables correct?	27	35		
27. Finish brazing butt joint.			28	
28. Clean up brazing butt joint.			29	
29. Does finished butt joint meet specs?	30	36		
30. Shut down oxy-fuel equipment.			E.O.T.	
31. Read work order.			2	Work Orders
32. Read blueprint.			3	Blueprint
33. Make work area hazard free.			13	
34. Realign butt joint to specifications.			20	
35. Correct brazing variables.			27	
36. Remove defective braze.			37	
37. Rebraze defective joint area.			30	

TASK ANALYSIS GIDE

I. Task Statement:

OXY-FUEL BRAZE COPPER LAP JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	29		
2. Is work done from blueprint?	30	3		
3. Obtain pieces of copper.			4	
4. Determine thickness of copper.			5	Measuring tools
5. Obtain brazing filler wire.			6	Manufacturer's Refer.
6. Is filler wire flux coated?	8	7		AWS A5.8 ASTM B260
7. Obtain flux for brazing wire.			8	Manufacturer's Refer.
8. Select brazing torch tip.			9	Manufacturer's tip Reference Chart
9. Set up oxy-fuel equipment.			10	Instruction Manual
10. Set oxygen pressure.			11	"The Oxy-Acetylene Hand Book"
11. Set fuel pressure.			12	"General Welding"
12. Is work area hazard free?	13	31		O.S.H.A.
13. Put on safety clothing & brazing gear.			14	Safety glasses, gloves, leathers, brazing goggles
14. Prepare copper surfaces for brazing.			15	Grinders, sanders, files, wire brush, chemicals
15. Secure parts in lap joint.			16	Clamping tools

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Position lap joint.			17	Positioning tools
17. Does lap joint meet specifications?	18	32		
18. Ignite oxy-fuel brazing torch.			19	Striker
19. Check flame parameters.			20	"Welding Technology"
20. Preheat brazing wire for flux.			21	"The Welder's Hand Book"
21. Apply flux to brazing wire.			22	
22. Preheat copper to brazing temp.			23	
23. Begin brazing lap joint.			24	
24. Are all brazing variables correct?	25	33		
25. Finish brazing lap joint.			26	
26. Clean up brazed lap joint.			27	
27. Does finished lap joint meet specs?	28	34		
28. Shut down oxy-fuel equipment.			E.O.T.	
29. Read work order.			2	Work order
30. Read blueprint.			3	Blueprint
31. Make work area hazard free.			13	
32. Realign lap joint to specifications.			18	
33. Correct brazing variables.			25	
34. Remove defective braze material.			35	
35. Rebraze defective joint area.			28	

TASK ANALYSIS GUIDE

I. Task Statement:

BRAZE STEEL TO BRASS BUTT JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	26		
2. Is work done from blueprint?	27	3		Blueprints
3. Obtain piece of brass and steel.			4	
4. Determine thickness of brass and steel.			5	Measuring tools
5. Select proper filler wire.			6	Manufacturer's Refer.
6. Is filler wire flux coated?	7	28		
7. Select tip for brazing.			8	Manufacturer's Refer.
8. Set up oxy-fuel equipment.			9	Instruction Manual
9. Set oxygen supply pressure.			10	"The Oxy-Acetylene Hand Book"
10. Set fuel supply pressure.			11	"General Welding Book"
11. Put on safety clothing and brazing gear.			12	Leathers, gloves, safety glasses and shields
12. Prepare parts for brazing.			13	O.S.H.A./"The Welder's Hand Book"
13. Secure parts into butt joint.			14	Clamping tools
14. Does joint meet specifications?	15	30		
15. Position butt joint.			16	Positioning tools
16. Is work area free from hazard	17	31		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Ignite oxy-fuel brazing tip.			18	Striker
18. Check flame parameters.			19	
19. Does butt joint need to be tacked?	32	20		
20. Begin brazing butt joint.			21	
21. Are all brazing variables correct?	22	33		
22. Finish brazing butt joint.			23	
23. Does finished joint meet specs.?	24	34		
24. Shut down oxy-fuel equipment.			25	
25. Clean up butt joint.			E.O.T.	
26. Read written work order.			2	Written work order
27. Read blueprint.			3	
28. Obtain flux for brazing.			29	Manufacturer's Refer.
29. Coat brazing wire with flux.			7	
30. Realign butt joint to specs.			15	
31. Make area hazard free.			17	
32. Tack joint.			20	
33. Correct brazing variables.			22	
34. Remove defective braze.			35	
35. Rebraze joint.			24	

TASK ANALYSIS GUIDE

I. Task Statement:

BRAZE STEEL TO BRASS LAP JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	26		
2. Is work done from blueprint?	27	3		
3. Obtain piece of brass & steel.			4	
4. Determine thickness of brass & steel.			5	Measuring tools
5. Select proper filler wire.			6	Manufacturer's wire Reference charts
6. Is filler wire flux coated?	7	28		
7. Select tip for brazing.			8	Manufacturer's tip Reference charts
8. Set up oxy-fuel equipment.			9	Instruction Manual
9. Set oxygen pressure.			10	"The Oxy-Acetylene Hand Book"
10. Set fuel pressure.			11	"General Welding" "The Welders Hand Book"
11. Put on safety clothing and brazing gear.			12	Safety glasses, gloves, leathers, goggles
12. Prepare parts for brazing.			13	Grinder, file, wire brush, chemical
13. Secure parts into lap joint.			14	Clamping tools
14. Does joint meet specifications?	15	30		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions Yes	Decisions No	Go To Step	Tools, References, Work Aids
15. Position lap joint.			16	Positioning tools
16. Is work area free from hazards?	17	31		
17. Ignite oxy-fuel brazing tip.			18	Striker
18. Check flame parameters.			19	
19. Does lap joint need to be tacked?	32	20		
20. Begin brazing lap joint.			21	
21. Are all brazing variables correct?	22	33		
22. Finish brazing lap joint.			23	
23. Does finished joint meet specs.?	24	34		
24. Shut down oxy-fuel equipment.			25	
25. Clean up lap joint.			E.O.T.	
26. Read written work order.			2	Written work order
27. Read blueprint.			3	Blueprint
28. Obtain flux for brazing wire.			29	Manufacturer's flux Reference Chart
29. Coat flux wire with flux.			7	"Welding Technology"
30. Realign lap joint to specifications.			15	
31. Make work area hazard free.			17	
32. Tack lap joint.			20	
33. Correct brazing variables.			22	
34. Remove defective braze.			35	
35. Rebraze joint.			24	

TASK ANALYSIS GUIDE

I. Task Statement:

OXY-FUEL BRAZE COPPER CORNER JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	31		
2. Is work done from blueprint?	32	3		
3. Obtain pieces of copper.			4	
4. Determine thickness of copper.			5	Measuring tools
5. Obtain thickness of copper.			6	AWS A5.8 ASTM B260
6. Is filler wire flux coated?	8	7		
7. Obtain flux for brazing wire.			8	Manufacturer's Refer.
8. Select brazing torch tip.			9	"General Welding"
9. Set up oxy-fuel equipment.			10	Instruction Manual
10. Set oxygen pressure.			11	"Welding Technology"
11. Set fuel pressure.			12	"The Oxy-Acetylene Hand Book"
12. Is work area free from hazard?	13	33		O.S.H.A.
13. Put on safety clothing and brazing gear.			14	Safety glasses, gloves, leathers, brazing shield
14. Prepare copper surface for brazing.			15	Grinder, sander, file, wire brush, chemical
15. Secure parts into corner joint.			16	Clamping tools
16. Position corner joint.			17	Positioning tools

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, Refetences, Work Aids
	Yes	No		
17. Does corner joint meet specifications?	18	34		Blueprint or code
18. Ignite oxy-fuel brazing torch.			19	Striker
19. Check flame parameters.			20	
20. Preheat brazing wire for flux.			21	"The Welder's Hand Book"
21. Apply flux to preheated brazing wire.			22	
22. Preheat copper to brazing temp.			23	
23. Does corner joint need to be tack brazed?	24	25		
24. Tack braze corner joint.			25	
25. Begin brazing corner joint.			26	
26. Are all brazing variables correct?	27	35		
27. Finish brazing corner joint.			28	
28. Clean up brazed corner joint.			29	Grinder, sander, file, wire brush, chemical
29. Does finished corner joint meet specs?	30	36		
30. Shut down oxy-fuel equipment.			E.O.T.	
31. Read work order.			2	Work order
32. Read blueprint.			3	Blueprint
33. Make work area hazard free.			13	
34. Realign corner joint to specs.			18	
35. Correct brazing variables.			27	
36. Remove defective braze from joint.			37	Grinder
37. Rebraze defective joint area.			30	

TASK ANALYSIS GUIDE

I. Task Statement:

HARD-FACE ALLOY STEEL WITH OXY-ACETYLENE

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	25		
2. Is work done from blueprint?	26	3		
3. Put on safety clothing.			4	Leathers, gloves, safety glasses
4. Is work area free from hazards?	5	27		
5. Obtain alloy steel to be hard-faced.			6	
6. Prepare surface for hard-facing.			7	Wire brush, grinder, sander, chemicals
7. Is hard-facing filler rod used?	8	28		Manufacturer's Refer.
8. Select oxy-fuel welding tip.			9	Manufacturer's Refer.
9. Set up oxy-fuel equipment.			10	Instruction Manual
10. Set oxygen supply pressure.			11	"The Oxy-Acetylene Hand Book"
11. Set fuel supply pressure.			12	"General Welding"
12. Is part to be preheated in furnace?	30	13		
13. Position alloy steel for hard-facing.			14	Positioning tools
14. Put on oxy-fuel welding gear.			15	Welding shield, Welding goggles
15. Ignite oxy-fuel welding torch.			16	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Check flame parameters.			17	
17. Preheat part with oxy-fuel torch.			18	
18. Begin hard-facing.			19	
19. Are all hard-facing variables correct?	20	31		
20. Finish hard-facing.			21	
21. Is hard-facing build up sufficient?	22	32		
22. Is rate of cooling controlled by torch?	23	33		Temperature sticks, Temperature meters
23. Shut down oxy-fuel equipment.			24	
24. Clean up hard-faced area.			E.O.T.	
25. Read written work order.			2	Written work orders
26. Read blueprint.			3	Blueprints
27. Make work area hazard free.			5	
28. Select hard-facing powder.			29	Manufacturer's Refer.
29. Obtain oxy-fuel torch for powder.			8	Manufacturer's Refer.
30. Preheat part in preheat furnace.			13	
31. Correct hard-facing variables.			20	
32. Add more hard-facing material.			22	
33. Control cooling by means available.			23	

TASK ANALYSIS GUIDE

I. Task Statement:

OXY-ACETYLENE HARD SURFACING ON CAST IRON

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	26		
2. Is work done form blueprint?	27	3		
3. Obtain cast iron to be hard faced.			4	
4. Determine thickness of cast iron.			5	Measuring tools
5. Obtain hard facing wire.			6	
6. Is hard facing wire flux coated?	7	28		
7. Select tip for hard facing torch.			8	Manufacturer's Refer.
8. Set up oxy-fuel equipment.			9	Instruction Manual
9. Set oxygen pressure			10	"The Oxy-Acetylene Hand Book"
10. Set fuel pressure.			11	"General Welding"
11. Is work area hazard free?	12	31		I.O.S.H.A.
12. Put on safety clothing and welding gear.			13	Safety glasses, gloves leathers, welding goggles
13. Prepare cast iron for hard surfacing.			14	Grinder, sander, file, wire brush, chemical
14. Is cast iron to be preheated by torch?	17	15		
15. Is cast iron to be preheated by a blow pipe?	32	16		
16. Is cast iron to be preheated by a furnace?	35	17		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Ignite oxy-fuel welding torch.			18	Striker
18. Check flame parameters.			19	"Welding Technology"
19. Preheat cast iron with welding torch.			20	
20. Begin hard surfacing cast iron.			21	
21. Are all hard facing variables correct?	22	38		
22. Finish hard facing cast iron.			23	
23. Clean up hard surfaced area.			24	Wire brush chemicals
24. Is build up of hard surfae material sufficient?	25	39		
25. Shut down oxy-fuel equipment.			E.O.T.	
26. Read work order.			2	Work order
27. Read blueprint.			3	Blueprint
28. Obtain flux for hard surfacing wire.			29	Manufacturer's refer.
29. Apply flux to hard surfacing wire.			30	
30. Apply flux to joint if needed.			7	
31. Make work area hazard free.			12	
32. Aim blow pipe over area to be hard surfaced.			33	Blow pipe
33. Ignite blow pipe.			34	
34. Preheat cast iron.			16	
35. Place cast iron in furnace.			36	Preheat furnace
36. Preheat cast iron with furnace.			37	
37. Remove and position cast iron with hard surfacing.			17	
38. Correct hard surfacing variables.			22	
39. Apply more hard surfacing material to cast iron.			25	

TASK ANALYSIS GUIDE

I. Task Statement:

COPPER ALLOY BRAZE CAST IRON LAP JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	36		
2. Is work done from blueprint?	37	3		
3. Obtain cast iron.			4	
4. Determine thickness, shape and size of cast iron.			5	Measuring tools
5. Obtain brazing filler wire.			6	AWS A5.8 ASTM B260
6. Is filler wire flux coated?	8	7		
7. Obtain flux for brazing wire.			8	Manufacturer's Refer.
8. Select brazing torch tip.			9	Manufacturer's Refer.
9. Set up oxy-fuel brazing equipment.			10	Instruction Manual
10. Set oxygen pressure.			11	"Welding Technology"
11. Set fuel pressure.			12	"The Oxy-Acetylene Hand Book"
12. Is work area hazard free?	13	38		I.O.S.H.A.
13. Put on safety clothing and brazing gear.			14	Safety glasses, gloves, leathers, brazing shield
14. Prepare cast iron for brazing.			15	Sander, file, wire brush, chemical
15. Does cast iron need to be beveled?	16	17		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Bevel cast iron.			17	Grinder
17. Secure cast iron into lap joint.			18	Clamping tools
18. Position cast iron lap joint.			19	Positioning tools
19. Does lap joint meet specifications?	20	39		Blueprint
20. Is cast iron to be preheated by oxy-fuel torch.	21	40		
21. Ignite oxy-fuel brazing torch.			22	
22. Check flame parameters.			23	
23. Preheat cast iron with brazing torch.			24	Preheat calculator
24. Check preheat temperature.			25	Pyrometer Temperature Stick
25. Preheat brazing filler wire.			26	Brazing torch
26. Apply flux to preheated brazing wire.			27	
27. Begin brazing cast iron lap joint.			28	
28. Are all brazing variables correct?	29	44		
29. Finish brazing cast iron lap joint.			30	
30. Clean brazed lap joint.			31	Sander, grinder, file, wire brush, chemical
31. Does finished lap joint meet specs.?	32	45		Blueprint or code
32. Does cooling of cast iron need to be controlled?	33	35		
33. Can cooling be controlled by use of brazing torch?	34	47		Brazing torch
34. Control rate of cooling with brazing torch.			35	
35. Shut down oxy-fuel equipment.			E.O.T.	
36. Read work order.			2	Work order

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
37. Read blueprint.			3	Blueprint
38. Make work area hazard free.			13	
39. Realign cast iron lap joint.			20	
40. Pick proper method available to preheat cast iron lap joint.			41	Furnace, blowpipe, bed of coke
41. Position cast iron to be preheated.			42	
42. Preheat cast iron.			43	
43. Check preheat temperature.			21	Pyrometer Temperature stick
44. Correct brazing variables.			29	
45. Remove defective braze.			46	Grinder, sander, file, wire brush, chemical
46. Rebraze defective joint area.			32	Furnace, blowpipe, bed of coke
47. Pick method available to apply post heat.			48	
48. Control cooling with post heat.			35	

TASK ANALYSIS GUIDE

I. Task Statement:

COPPER ALLOY BRAZE CAST IRON BUTT JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	36		
2. Is work done from blueprint?	37	3		
3. Obtain cast iron.			4	
4. Determine thickness, shape and size of cast iron.			5	Measuring tools
5. Obtain brazing filler wire.			6	AWS A5.8 ASTM B260
6. Is filler wire flux coated?	8	7		
7. Obtain flux for brazing filler wire.			8	Manufacturer's Refer.
8. Select brazing torch tip.			9	Manufacturer's Refer.
9. Set up oxy-fuel brazing equipment.			10	Instruction Manual
10. Set oxygen pressure.			11	"Welding Technology"
11. Set fuel pressure.			12	"The Oxy-Acetylene Hand Book"
12. Is work area hazard free?	13	38		I.O.S.H.A.
13. Put on safety clothing & brazing gear.			14	Safety glasses, gloves, leathers, brazing shield
14. Prepare cast iron for brazing.			15	Sander, file, wire brush, chemical

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
15. Does cast iron need to be beveled?	16	17		
16. Bevel edges of cast iron.			17	Grinder
17. Secure cast iron into butt joint.			18	Clamping tools
18. Position cast iron butt joint.			19	Positioning tools
19. Does butt joint meet specifications?	20	39		Blueprint
20. Is cast iron to be preheated with oxy-fuel torch?	21	40		"The Welder's Hand Book"
21. Ignite oxy-fuel brazing torch.			22	Striker
22. Check flame parameters.			23	
23. Preheat cast iron with torch.			24	Preheat Calculator
24. Check preheat temperature.			25	Pyrometer Temperature Stick
25. Preheat brazing filler wire.			26	Brazing torch
26. Apply flux to preheated brazing wire.			27	
27. Begin brazing cast iron butt joint.			28	
28. Are all brazing variables correct?	29	44		
29. Finish brazing cast iron butt joint.			30	
30. Clean brazed butt joint.			31	Sander, grinder, file, wire brush, chemical
31. Does finished butt joint meet specs.?	32	45		Blueprint or code
32. Does cooling of cast iron need to be controlled?	33	35		Post heat calculator
33. Can cooling of cast iron be controlled by brazing torch?	34	47		Brazing torch
34. Control cooling with oxy-fuel torch.			35	
35. Shut down oxy-fuel equipment.			E.O.T.	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
36. Read work order.			2	Work order
37. Read blueprint.			3	Blueprint
38. Make work area hazard free.			13	
39. Realign cast iron butt joint.			20	
40. Pick proper method available to preheat cast iron butt joint.			41	Furnace, blowpipe, Bed of Coke
41. Position cast iron to be preheated.			42	
42. Preheat cast iron.			43	
43. Check preheat temperature.			21	Pyrometer Temperature Stick
44. Correct brazing variables.			29	
45. Remove defective braze.			46	Grinder, sander, file, wire brush, chemical
46. Rebraze defective joint area.			32	
47. Pick method available to apply post heat.			48	Furnace, blowpipe, Bed of Coke
48. Control cooling with post heat.			35	

TASK ANALYSIS GUIDE

I. Task Statement:

BRAZE COPPER TO STEEL LAP JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	26		
2. Is work done from blueprint?	27	3		
3. Obtain pieces of copper and steel.			4	
4. Determine thickness of copper and steel.			5	Measuring tools
5. Obtain suitable brazing wire.			6	AWS A5.8 ASTM B260
6. Is brazing wire flux coated?	7	28		
7. Select brazing torch tip.			8	Manufacturer's tip Reference
8. Set up oxy-fuel equipment.			9	Instruction Manual
9. Set oxygen pressure.			10	"The Oxy-Acetylene Hand Book"
10. Set fuel pressure			11	"General Welding"
11. Is work area hazard free?	12	31		O.S.H.A.
12. Put on safety clothing and brazing gear.			13	Safety glasses, gloves, leathers, brazing goggles
13. Prepare metal for brazing.			14	Grinders, sander, wire brush, chemical
14. Secure metal into lap joint.			15	Clamping tools

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
15. Position lap joint.			16	Positioning tools
16. Does joint meet specification?	17	32		
17. Preheat metal for brazing.			18	Furnace, blowpipe, bed of coke, torch
18. Ignite oxy-fuel brazing torch.			19	Striker
19. Check flame parameters.			20	"Welding Technology"
20. Begin brazing lap joint.			21	"The Welders Hand Book"
21. Are all brazing variables correct?	22	33		
22. Finish brazing joint.			23	
23. Clean brazed joint.			24	
24. Does finished joint meet specs.?	25	34		
25. Shut down oxy-fuel equipment.			E.O.T.	
26. Read written work order.			2	Written work order
27. Read blueprint.			3	Blueprint
28. Obtain flux for brazing wire.			29	Manufacturer's Refer.
29. Heat brazing wire with torch.			30	
30. Apply flux to hot brazing wire by dipping.			7	
31. Make work area hazard free.			12	
32. Realign lap joint to specifications.			17	
33. Correct brazing variables.			22	
34. Remove defective braze.			35	
35. Rebraze joint.			22	

TASK ANALYSIS GUIDE

I. Task Statement:

BRAZE COPPER TO STEEL TEE JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	26		
2. Is work done from blueprint?	27	3		
3. Obtain pieces of copper and steel.			4	
4. Determine thickness of metal.			5	Rule, micrometer, tape Measuring tools
5. Obtain proper brazing wire.			6	Manufacturer's refer.
6. Set up oxy-fuel equipment			7	Instruction Manual
7. Set oxygen pressure			8	"The Oxy-Acetylene Hand book"
8. Set fuel pressure			9	"General Welding"
9. Is brazing wire flux coated?	10	28		
10. Select brazing tip			8	Manufacturer's reference
11. Is work area hazard free?	12	31		O.S.H.A.
12. Put on safety clothing and brazing gear.			13	Safety glasses, gloves, leathers, brazing goggles
13. Prepare metal for brazing.			14	Grinder, sanders, file, wire brush
14. Secure metal into tee joint.			15	Clamps
15. Position tee joint.			16	Positioning tools

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Does tee joint meet specifications?	17	32		
17. Ignite oxy-fuel brazing torch.			18	Striker
18. Check flame parameters			19	"Welding Technology"
19. Preheat metal for brazing.			20	
20. Begin brazing tee joint.			21	
21. Are all brazing variables correct?	22	33		"The Welder's Hand Book"
22. Finish brazing tee joint.			23	
23. Clean brazed tee joint.			24	
24. Does tee joint meet specifications?	25	34		
25. Shut down oxy-fuel equipment.			E.O.T.	
26. Read written work order.			2	Written work order
27. Read blueprint.			3	Blueprint
28. Obtain flux for brazing wire.			29	Manufacturer's Refer.
29. Heat wire to apply flux.			30	Torch
30. Apply flux to heated wire.			10	
31. Make work area hazard free.			12	
32. Realign tee joint to specifications.			17	
33. Correct brazing variables.			22	
34. Remove defective braze from joint.			35	
35. Rebraze defective joint area.			25	

TASK ANALYSIS GUIDE

I. Task Statement:

BRAZE COPPER TO STEEL BUTT JOINT.

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	31		
2. Is work done from blueprint?	32	3		
3. Obtain pieces of copper and steel			4	
4. Determine thickness of copper and steel.			5	Measuring tools
5. Obtain proper brazing wire.			6	Manufacturer's refer.
6. Is brazing wire flux coated?	8	7		
7. Obtain flux for brazing wire.			8	Manufacturer's refer.
8. Select brazing torch tip.			9	"The Oxy-Acetylene Hand Book"
9. Set up oxy-fuel brazing equipment.			10	Instruciton Manual
10. Set oxygen pressure.			11	"General Welding"
11. Set fuel pressure.			12	"The Welder's Hand Book"
12. Is work area hazard free?	13	33		O.S.H.A.
13. Put on safety clothing and brazing gear.			14	Safety glasses, gloves, leathers, brazing shield
14. Prepare metal for brazing.			15	Grinders, sanders, file, wire brush, chemicals
15. Does metal need to be beveled?	16	17		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Grind bevel on metal pieces.			17	Grinder
17. Secure metal into butt joint.			18	Clamping tools
18. Position butt joint.			19	Positioning tools
19. Does butt joint meet specifications?	20	34		
20. Ignite oxy-fuel brazing torch.			21	Striker
21. Check flame parameters.			22	
22. Preheat metal with torch.			23	Torch
23. Preheat brazing wire for flux.			24	
24. Apply flux to heated brazing wire.			25	
25. Begin brazing butt joint.			26	
26. Are all brazing variables correct?	27	35		"Welding Technology"
27. Finish brazing butt joint.			28	
28. Clean up brazed joint.			29	
29. Does brazed butt joint meet specs.?	30	36		
30. Shut down oxy-fuel equipment.			E.O.T.	
31. Read work order.			2	Written work order
32. Read blueprint.			3	Blueprint
33. Make work area hazard free.			13	
34. Realign butt joint.			20	
35. Correct brazing variables.			27	
36. Remove defective braze from joint.			37	
37. Rebraze defective joint.			30	

TASK ANALYSIS GUIDE

I. Task Statement:

COPPER ALLOY BRAZE COPPER ALLOY CORNER JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	31		
2. Is work done from blueprint?	32	3		
3. Obtain pieces of alloyed copper.			4	
4. Determine thickness of alloyed copper.			5	Measuring tools
5. Select brazing filler wire.			6	AWS A5.8 ASTM B260
6. Is brazing wire flux coated?	8	7		
7. Obtain flux for brazing wire.			8	Manufacturer's refer.
8. Select tip for brazing torch.			9	Manufacturer's refer.
9. Set up oxy-fuel brazing equipment.			10	Instruction Manual
10. Set oxygen pressure.			11	"The Oxy-Acetylene Hand Book"
11. Set fuel pressure.			12	"General Welding"
12. Is work are hazard free?	13	33		
13. Put on safety clothing & brazing gear.			14	Safety glasses, gloves, leathers, braze goggles
14. Prepare copper surfaces for brazing.			15	Sander, wire brush, file, chemical
15. Secure copper into corner joint.			16	Clamping tools

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Position copper corner joint.			17	Positioning tools
17. Does corner joint meet specs.?	18	34		Blueprint
18. Ignite oxy-fuel brazing torch.			19	Striker
19. Check flame parameters.			20	"Welding Technology"
20. Preheat copper with brazing torch.			21	"The Welder's Hand Book"
21. Preheat tip for brazing wire.			22	
22. Apply flux to preheated brazing wire			23	
23. Does corner joint need to be tacked?	24	25		
24. Tack braze corner joint.			25	
25. Begin brazing corner joint.			26	
26. Are all brazing variables correct?	27	35		
27. Finish brazing corner joint.			28	
28. Clean flux off of corner joint.			29	Chemical, wire brush, file, sander
29. Does brazed joint meet specs.?	30	36		Blueprint or code
30. Shut down oxy-fuel equipment.			E.O.T.	
31. Read work order.			2	Work order
32. Read blueprint.			3	Blueprint
33. Make work area hazard free.			13	
34. Realign corner joint to specs.			18	
35. Correct improper brazing variables.			27	
36. Remove defective braze material.			37	Grinder
37. Rebraze defective joint area.			30	

TASK ANALYSIS GUIDE

I. Task Statement:

COPPER ALLOY BRAZE COPPER ALLOY TEE JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	33		
2. Is work done from blueprint?	34	3		
3. Obtain pieces of alloyed copper.			4	
4. Determine thickness of alloyed copper.			5	Measuring tools
5. Select brazing filler wire.			6	AWS A5.8 ASTM B260
6. Is filler wire flux coated?	8	7		
7. Obtain flux for brazing wire.			8	Manufacturer's refer.
8. Select tip for brazing torch.			9	Manufacturer's refer.
9. Set up oxy-fuel brazing equipment.			10	Instruction Manuel
10. Set oxygen pressure.			11	"The Oxy-Acetylene Hand Book"
11. Set fuel pressure.			12	"General Welding"
12. Is work area hazard free?	13	35		I.O.S.H.A.
13. Put on safety clothing & brazing gear.			14	Safety glasses, gloves, leathers, brazing goggles
14. Prepare copper surface for brazing.			15	Sander, wire brush, file, chemical
15. Does copper need to be beveled?	16	17		

TASK ANALYSIS GUIDE

TASK ELEMENTS		Decisions		Go To Step	Tools, References, Work Aids
		Yes	No		
16.	Bevel copper for brazing.			17	Grinder
17.	Secure copper into tee joint.			18	Clamping tools
18.	Position tee joint.			19	Positioning tools
19.	Does tee joint meet specifications?	20	36		Blueprint
20.	Ignite oxy-fuel brazing torch.			21	Striker
21.	Check flame parameters.			22	"The Welder's Hand Book"
22.	Preheat copper with brazing torch.			23	"Welding Technology"
23.	Preheat copper brazing wire for flux.			24	
24.	Apply flux to brazing wire.			25	
25.	Does tee joint need to be tack brazed?	26	27		
26.	Tack braze tee joint.			27	
27.	Begin brazing tee joint.			28	
28.	Are all brazing variables correct?	29	37		
29.	Finish brazing tee joint.			30	
30.	Clean flux off tee joint.			31	Chemical, sander
31.	Does brazed joint meet specifications?	32	38		
32.	Shut down oxy-fuel equipment.			E.O.T.	
33.	Read work order.			2	Work Order
34.	Read blueprint.			3	Blue print
35.	Make work area hazard free			13	
36.	Realign tee joint to specifications.			20	
37.	Correct improper brazing variables.			29	
38.	Remove defective braze material.			39	Grinder
39.	Rebraze defective joint area.			32	

TASK ANALYSIS GUIDE

I. Task Statement:

COPPER ALLOY BRAZE COPPER ALLOY LAP JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	31		
2. Is work done from blueprint?	32	3		
3. Obtain pieces of alloyed copper.			4	
4. Determine thickness of alloyed copper.			5	Measuring tools
5. Select brazing filler wire.			6	AWS A5.8 ASTM B260
6. Is filler wire flux coated?	8	7		
7. Obtain flux for brazing wire.			8	Manufacture's Refer.
8. Select tip for brazing torch.			9	Manufacture's Refer.
9. Set up oxy-fuel equipment.			10	Instruction Manual
10. Set oxygen pressure.			11	"The Oxy-Acetylene Hand Book"
11. Set fuel pressure.			12	"General Welding"
12. Is work area hazard free?	13	33		I.O.S.H.A.
13. Put on safety clothing and brazing gear.			14	Safety glasses, gloves leathers, braze goggles
14. Prepare copper surfaces for brazing.			15	Sanders, wire brushes file, chemical
15. Secure copper into lap joint.			16	Clamping tools

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Position copper lap joint.			17	Positioning tools
17. Does lap joint meet specifications?	18	34		Blue prints
18. Ignite oxy-fuel brazing torch.			19	Striker
19. Check flame parameters.			20	"Welding Technology"
20 Preheat copper with brazing torch.			21	"The Welder's Handbook"
21. Preheat tip of copper brazing wire.			22	
22. Apply flux to preheated brazing wire.			23	
23. Does lap joint need to be tacked?	24	25		
24. Tack braze lap joint.			25	
25. Begin brazing lap joint.			26	
26. Are all brazing variables correct?	27	35		
27. Finish brazing lap joint.			28	
28. Clean flux off of lap joint.			29	File, chemicals, wire brush
29. Does brazed joint meet specifications?	30	36		Blueprint or codes
30. Shut down oxy-fuel equipment.			E.O.T.	
31. Read work order.			2	Work order
32. Read blueprint.			3	Blueprint
33. Make work area hazard free.			13	
34. Realign lap joint to specifications.			18	
35. Correct improper brazing variables.			27	
36. Remove defective braze material.			37	Grinder
37. Rebraze defective joint area.			30.	

TASK ANALYSIS GUIDE

I. Task Statement:

COPPER ALLOY BRAZE COPPER ALLOY BUTT JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	33		
2. Is work done from blueprint.	34	3		
3. Obtain pieces of alloyed copper.			4	
4. Determine thickness of alloyed copper.			5	Measuring tools
5. Select brazing filler wire.			6	AWS A5.8 ASTM B260
6. Is filler wire flux coated?	8	7		
7. Obtain flux for brazing wire.			8	Manufacturer's Refer.
8. Select tip for brazing torch.			9	Manufacturer's Refer.
9. Set up oxy-fuel brazing equipment.			10	Instruction Manual
10. Set oxygen pressure.			11	"The Oxy-Acetylene Hand Book"
11. Set fuel pressure.			12	"General Welding"
12. Is work area hazard free?	13	35		I.O.S.H.A.
13. Put on safety clothing and brazing gear.			14	Safety glasses, gloves leather, braze shields
14. Prepare copper surfaces for brazing.			15	Sander, wire brush, file, chemical
15. Does copper need to be beveled?	16	17		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Bevel copper for brazing.			17	Grinder
17. Secure copper into butt joint.			18	Clamping tools
18. Position butt joint for brazing.			19	Positioning tools'
19. Does butt joint meet specifications?	20	36		Blueprint
20. Ignite oxy-fuel brazing torch.			21	Striker
21. Check flame parameters.			22	"The Welders' Hand Book"
22. Preheat copper with brazing torch.			23	"Welding Technology"
23. Preheat brazing wire for flux.			24	
24. Apply flux to brazing wire.			25	
25. Does butt joint need to be tack brazed?	26	27		
26. Tack braze butt joint.			27	
27. Begin brazing butt joint.			28	
28. Are all brazing variable correct?	29	37		
29. Finish brazing butt joint.			30	
30. Clean flux off butt joint.			31	Chemicals, sander
31. Does brazed joint meet specifications?	32	38		
32. Shut down oxy-fuel equipment.			E.O.T.	
33. Read work order.			2	Work Order
34. Read blueprint.			3	Blueprint
35. Make work area hazard free.			13	
36. Realign butt joint to specifications.			20	
37. Correct improper brazing variables.			29	
38. Remove defective braze material			39	Grinder
39. Rebraze defective joint area.			32	

TASK ANALYSIS GUIDE

I. Task Statement:

COPPER ALLOY BRAZE COPPER ALLOY EDGE JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is work order verbal?	2	31		
2. Is work done from blueprint?	32	3		
3. Obtain pieces of alloyed copper.			4	
4. Determine thickness of copper.			5	Measuring tools
5. Select brazing filler wire.			6	AWS A5.8 ASTM B260
6. Is filler wire flux coated?	8	7		
7. Obtain flux for brazing wire.			8	Manufacturer's refer.
8. Select tip for brazing torch.			9	Manufacturer's refer.
9. Set up oxy-fuel brazing equipment.			10	Instruction Manuel
10. Set oxygen pressure.			11	"The Oxy-Acetylene Hand Book"
11. Set fuel pressure.			12	"General Welding"
12. Is work area hazard free?	13	33		I.O.S.H.A.
13. Put on safety clothing & brazing gear.			14	Safety glasses, gloves, leathers, braze goggles
14. Prepare copper surface for brazing.			15	Sander, wire brush, file, chemical
15. Secure copper into edge joint.			16	Clamping tools

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Position edge joint.			17	Positioning tools
17. Does edge joint meet specifications?	18	34		Blueprint
18. Ignite oxy-fuel brazing tip.			19	Striker
19. Check flame parameters.			20	"Welding Technology"
20. Preheat copper with brazing torch.			21	"The Welder's Hand Book"
21. Preheat tip for brazing wire.			22	
22. Apply flux to brazing wire.			23	
23. Does edge joint need to be tacked?	24	25		
24. Take braze edge joint.			25	
25. Begin brazing edge joint.			26	
26. Are all brazing variables correct?	27	35		
27. Finish brazing edge joint.			28	
28. Clean flux off of edge joint.			29	Chemicals, files, wire brush, sander
29. Does brazed joint meet specs.?	30	36		Blueprint
30. Shut down oxy-fuel equipment.			E.O.T.	
31. Read work order.			2	Work order
32. Read blueprint.			3	Blueprint
33. Make work area hazard free.			13	
34. Realign edge joint to specs.			18	
35. Correct improper brazing variables.			27	
36. Remove defective braze material.			37	Grinder
37. Rebraze defective joint area.			30	

TASKS BY DAN STERRETT

The following section contains the tasks written by Dan Sterrett. The tasks are outlined on this sheet. You will find the tasks in this section to be in the order as listed below.

CHECK JOINT FIT UP
G.M.A.W. STAINLESS STEEL TEE JOINT
G.M.A.W. STAINLESS STEEL EDGE JOINT
G.M.A.W. ALUMINUM TEE JOINT
G.M.A.W. ALUMINUM EDGE JOINT
G.M.A.W. ALUMINUM CORNER JOINT
G.M.A.W. ALUMINUM BUTT JOINT
G.M.A.W. (FLUX CORE) MILD STEEL PLAY HOLES
G.M.A.W. STAINLESS STEEL CORNER JOINT
G.M.A.W. STAINLESS STEEL BUTT JOINT
G.M.A.W. STAINLESS STEEL LAP JOINT
G.M.A.W. ALUMINUM LAP JOINT
G.M.A.W. ALUMINUM PLUG HOLES
G.M.A.W. (FLUX CORE) STAINLESS STEEL TEE JOINT
G.M.A.W. BUILD SURFACE ALLOY STEEL
G.M.A.W. GALVANIZED STEEL CARBON STEEL TEE JOINT
G.M.A.W. BUILD WORN SURFACE ALLOY STEEL
G.M.A.W. GALVANIZED STEEL EDGE JOINT
G.M.A.W. GALVANIZED CARBON STEEL CORNER JOINT
G.M.A.W. GALVANIZED CARBON STEEL BUTT JOINT
G.M.A.W. BUILD UP WORN PARTS HARD SURFACE
G.M.A.W. BUILDING WORN SURFACE ALUMINUM
G.M.A.W. CAST IRON BUTT JOINT
G.M.A.W. HARD SURFACE STEEL
G.M.A.W. (FLUX CORE) STAINLESS STEEL EDGE JOINT
G.M.A.W. HARD SURFACE STEEL
G.M.A.W. (FLUX CORE) STAINLESS STEEL CORNER JOINT
G.M.A.W. (FLUX CORE) STAINLESS STEEL BUTT JOINT
G.M.A.W. (FLUX CORE) STAINLESS STEEL LAP JOINT
G.M.A.W. CAST IRON HARD SURFACE
G.M.A.W. HARDFACE ALLOY STEEL
G.M.A.W. BUILD UP WORN PARTS BEFORE APPLYING HARD SURFACING MATERIAL
G.M.A.W. CAST IRON CORNER JOINT

TASK ANALYSIS GUIDE

I. Task Statement: CHECK JOINT FIT-UP

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	8		
2. Does joint require root gap?	3	9		
3. Are materials of equal thickness?	4	10		
4. Are tacks sufficient to hold proper fit up?	5	11		
5. Check for squareness of joint			6	
6. Is joint designed per specifications?	7	12		
7. Have joint welded			EOT	
8. Read blueprint or drawing			2	
9. Be sure fit up is tight			3	
10. Use Hi-Lo Gauge to check alignment			4	
11. Have extra tacks added			5	
12. Have parts re-weld prepared			7	

TASK ANALYSIS GUIDE

I. Task Statement: GMAW-STAINLESS STEEL-TEE JOINT

II. Task Performance Cues: Work Order

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	18		
2. Set up GMAW Equipment			3	GMAW Machine, filler shielding gas
3. Select proper filler wire			4	filler wire, selection chart
4. Select proper shielding gas			5	argon, argon mix
5. Put on welding gear			6	helmet, gloves, lens, safety glasses
6. Will parts be tacked?	7	19		
7. Clean and position parts			8	wire brush, grinder
8. Secure parts			9	
9. Are parts properly aligned?	10	20		square, level, ruler, measuring tools
10. Begin welding parts together			11	
11. Burn into root for penetration			12	
12. Is proper bead contour and size forming	13	21		fillet weld gauge
13. Is there any undercut?	22	14		
14. Complete weld			15	
15. Visually inspect weld			16	
16. Are there any weld deformities?	23	17		cracks, porosity
17. Shut down equipment			E.O.T.	symbols, print

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
18. Read blueprint or drawing			2	
19. Place parts in some type of positioner			9	positioning tools
20. Realign parts for fitup			10	
21. Check and adjust welding parameters			13	meters
22. Run another bead to fill undercut			14	
23. Remove defective weld			24	grinder, arc air
24. Reweld defective area			15	

TASK ANALYSIS GUIDE

I. Task Statement: GMAW--STAINLESS STEEL-EDGE JOINT

II. Task Performance Cues: WORK ORDER

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	18		
2. Is metal to be welded under 3/16" thick	3	19		joint design
3. Set up GMAW equipment			4	GMAW equipment
4. Select proper filler metal			5	Reference chart
5. Select proper shielding gas			6	argon, argon mix
6. Put on welding safety gear			7	leather, helmet, gloves, safety glasses
7. Will parts be tacked?	8	20		tacking method
8. Clean and position parts			9	mechanical & chemical
9. Secure parts			10	
10. Are parts properly aligned?	11	21		ruler, square, level
11. Begin welding operation			12	
12. Burn into root for penetration			13	
13. Is proper bead contour and size forming	14	22		filler weld gauge
14. Complete weld			15	
15. Visually inspect weld			16	
16. Are there any weld deformities?	23	17		cracks, porosity
17. Shut down equipment			E.O.T.	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
18. Read blueprint or drawing			2	symbols, prints
19. Prepare edges for welding			3	grinder, arc air, machining
20. Place parts in some type of positioner			8	positioning tools
21. Realign parts			11	
22. Check all welding parameters			14	meters
23. Remove defective weld area			14	grinder, arc air

TASK ANALYSIS GUIDE

I. Task Statement: GMAW-—ALUMINUM-TEE JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	19		
2. Set up GMAW equipment			3	GMAW equipment
3. Select proper filler wire			4	Reference chart
4. Select proper shielding gas			5	argon, argon mix
5. Put on welding safety gear			6	leathers, helmet, gloves, safety glasses
6. Will parts be tacked?	7	20		tacking method
7. Clean and position parts			8	mechanical & chemical
8. Secure parts			9	
9. Are parts properly aligned?	10	21		ruler, square, level
10. Begin welding operation			11	
11. Burn into root for penetration			12	
12. Is proper bead size and contour forming	13	22		fillet gauge
13. Is there any undercut forming	23	14		
14. Will there need to be more than one bead run?	24	15		Multipass procedures
15. Complete weld			16	
16. Visually inspect weld			17	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Are there any surface discontinuities?	25	18		cracks, porosity
18. Shut down equipment			E.O.T.	
19. Read blueprint or drawing			2	symbols, prints
20. Place parts in some type of positioner			7	positioning tools
21. Realign parts			10	
22. Check welding paremeters			13	meters
23. Run another bead to fill undercut			14	
24. Remove aluminum oxide before welding			15	
25. Remove unacceptable weld area			15	arc air, grinder, chisel

TASK ANALYSIS GUIDE

I. Task Statement: GMAW—ALUMINUM-EDGE JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions Yes	Decisions No	Go To Step	Tools, References, Work Aids
1. Is it a verbal order?	2	18		
2. Is metal to be welded under 3/16"?	3	19		joint design
3. Set up GMAW equipment			4	GMAW equipment
4. Select filler metal			5	reference chart
5. Select shielding gas			6	gas types
6. Put on welding safety gear			7	helmet, gloves, leathers, safety glasses
7. Will parts be tacked?	8	20		tacking methods
8. Clean and position parts			9	mechanical & chemical
9. Secure parts			10	
10. Are parts properly aligned?	11	21		ruler, square, level
11. Begin welding operation			12	
12. Burn into root for penetration			13	
13. Is proper bead forming	14	22		size, contour
14. Complete weld			15	
15. Visually inspect weld			16	
16. Are there any surface discontinuities?	23	17		cracks, porosity
17. Shut down equipment			E.O.T.	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
18. Read blueprint or drawing			2	symbols, prints
19. Prepare edges for welding			3	grinder, arc air, machining
20. Place parts in some type of positioner			8	positioning tools
21. Realign parts			11	
22. Check welding parameters			14	meters
23. Remove defective weld area			14	

TASK ANALYSIS GUIDE

I. Task Statement: GMAW—ALUMINUM—CORNER JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	17		
2. Set up GMAW equipment			3	GMAW equipment
3. Select proper filler metal			4	reference chart
4. Put on welding safety gear			5	leathers, gloves, helmet
5. Will edges need to be weld prepped?	18	6		joint design
6. Will parts be tacked?	7	19		tacking methods
7. Clean and position parts			8	mechanical & chemical
8. Secure parts			9	
9. Are parts properly aligned?	10	20		ruler, square, level
10. Begin welding operation			11	
11. Burn into root for penetration			12	
12. Is proper bead size and contour forming	13	21		fillet gauge
13. Complete weld			14	
14. Visually inspect weld			15	
15. Are there any surface defects?	22	16		cracks, porosity
16. Shut down equipment			E.O.T.	
17. Read blueprint or drawing			2	symbols, prints

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
18. Prepare edges for welding			6	grinder, machining
19. Place parts in some type of positioner			7	positioning tools
20. Realign parts			10	
21. Check welding parameters			13	meters
22. Remove defective weld area			13	grinder, arc air, chisel

TASK ANALYSIS GUIDE

I. Task Statement: GMAW-ALUMINUM-BUTT JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	19		
2. Is metal to be welded under 3/16" thick	3	20		joint design
3. Set up GMAW equipment			4	GMAW equipment
4. Select filler metal			5	reference chart
5. Will backing strip be used?	21	6		backing material
6. Will parts be tacked?	7	22		tacking methods
7. Clean and position parts			8	mechanical & chemical
8. Secure parts			9	Holding methods
9. Put on welding safety gear			10	leathers, helmet, gloves, safety glasses
10. Are parts properly aligned?	11	23		ruler, square, level
11. Begin welding operation			12	
12. Burn into root for complete penetration			13	
13. Key hole the puddle			14	
14. Is proper bead size and contour forming	15	24		fillet gauge
15. Complete the weld			16	
16. Visually inspect the weld			17	
17. Are there any surface defects?	25	18		cracks, porosity

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
18. Shut down equipment			E.O.T.	
19. Read blueprint or drawing			2	symbols, prints
20. Prepare edges for welding			3	grinder, file, machining
21. Place backup strip in proper place			6	
22. Place parts in some type of positioner			7	
23. Realign parts			11	
24. Check welding parameters			15	meters
25. Remove defective weld area			15	grinder, arc air

TASK ANALYSIS GUIDE

I. Task Statement: GMAW--FLUX CORE--PLUG HOLES--CARBON (MILD) STEEL

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	18		
2. Is metal to be welded under 3/16" thick?	19	3		
3. Set up FCAW equipment			4	
4. Select filler metal			5	
5. Is wire self-shielding?	6	20		
6. Put on welding safety gear			7	
7. Begin hole plugging operation			8	
8. Chip Slag			9	
9. Is weld defective?	21	10		
10. Turn part over			11	
11. Clean out Slag from hole			12	
12. Fill hole from back side			13	
13. Chip Slag			14	
14. Will welds need to be ground flush?	22	15		
15. Inspect both sides of hole			16	
16. Are there any Slag inclusions?	23	17		
17. Shut down equipment			EOT	
18. Read blue print or drawing			2	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
19. Place backing plate under hole			3	
20. Obtain and set-up proper shielding gas			6	
21. Check Welding parameters			7	
22. Grind welds flush			15	
23. Remove Slag and Re-weld			15	

TASK ANALYSIS GUIDE

I. Task Statement: GMAW-STAINLESS STEEL-CORNER JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is It A Verbal Order?	2	17		
2. Set Up GMAW Equipment			3	GMAW Equipment
3. Select Proper Filler Metal			4	Reference Chart
4. Put On Welding Gear			5	Leathers, Gloves, Helmet, Safety Glasses
5. Will Edges Need To Be Weld Prepped?	18	6		Joint Design
6. Will Parts Be Tacked?	7	19		Tacking Method
7. Clean and Position Parts			8	Mechanical & Chemical
8. Secure Parts			9	
9. Are Parts Properly Aligned?	10	20		Ruler, Square, Level
10. Begin Welding Operation			11	
11. Burn Into Root For Penetration			12	
12. Is Proper Bead Contour and Size Forming?	13	21		Fillet Weld Gauge
13. Complete Weld			14	
14. Visually Inspect Weld			15	
15. Are There Any Weld Defects?	22	16		Cracks, Porosity

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Shut Down Equipment			EOT	
17. Read Blueprint or Drawing			2	Symbols, Print
18. Prepare Edges for Welding			6	Grinder, Arc Air
19. Place Parts is Some Type of Positioner.			7	Positioning Tools
20. Realign Parts			10	
21. Check Welding Parameters			13	Meters
22. Remove Defective Weld Area			13	Arc Air, Grinder

TASK ANALYSIS GUIDE

I. Task Statement: GMAW-STAINLESS STEEL-BUTT JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is It A verbal Order?	2	19		
2. Is Metal To Be Welded Under 3/16 inch Thick?	3	20		Joint Design
3. Set Up GMAW Equipment			4	GMAW Equipment
4. Select Filler Metal			5	Reference Chart
5. Will Backing Strip Be Used?	21	6		Backing Materials
6. Will Parts Be Tacked?	7	22		Tacking Methods
7. Clean and Position Parts			8	Mechanical & Chemical
8. Secure Parts			9	
9. Put on Welding Gear			10	Leathers, Gloves, Helmet, Safety Glasse
10. Are Parts Properly Aligned?	11	23		Ruler, Square, Level
11. Begin Welding Operation			12	
12. Burn Into Root for Complete Penetration			13	
13. Key Hole the Puddle			14	
14. Is Proper Bead Contour and Size forming?	15	24		Fillet Weld Guage
15. Complete the Weld			16	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Visually Inspect the Weld			17	
17. Are There Any Surface Defects?	25	18		Cracks, Porosity
18. Shut Down Equipment			EOT	
19. Read Blueprint or Drawing			2	Symbols, Prints
20. Prepare Edges for Welding			3	Grinder, Arc Air Machining
21. Place Back Up Strip in Proper Place			6	Fit Up Prodedure
22. Place Parts in Some Type of Positioner.			7	Positioning Tools
23. Realign Parts			11	
24. Check Welding Parameters			15	Meters
25. Remove Defective Weld Area			15	Grinder, Arc Air

TASK ANALYSIS GUIDE

I. Task Statement:

GMAW -STAINLESS STEEL-LAP JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	18		
2. Will joint require more than one pass?	19	3		joint design
3. Set up GMAW equipment			4	GMAW equipment
4. Select filler metal			5	filler metal ref. car
5. Put on welding safety gear			6	gloves, helmet, leathers, safety glasses
6. Will parts be tacked ?	7	20		
7. Clean and position parts			8	mechanical & chemical
8. Secure parts			9	
9. Are parts properly aligned?	10	21		ruler, level, square
10. Begin welding operation			11	
11. Burn into root for penetration			12	
12. Is proper bead contour and size forming	13	22		fillet weld guage
13. Complete weld			14	
14. Visually inspect weld			15	
15. Are there any surface deformities?	23	16		cracks, porosity
16. Complete weld			17	
17. Shut down equipment			E.O.T.	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
18. Read blueprint or drawing			2	symbols, prints
19. Use multipass method for propersize weld			3	weave & stringer
20. Place parts in some type of positioner			7	positioning tools
21. Realign parts			10	
22. Check welding parameters			13	meters, gas flow
23. Remove defective weld area			13	grinder, arc air

TASK ANALYSIS GUIDE

I. Task Statement: GMAW .-ALUMINUM-LAP JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	17		
2. Will joint require more than one pass?	18	3		joint design
3. Set up GMAW equipment			4	GMAW equipment
4. Select filler metal			5	reference chart
5. Put on welding safety gear			6	leathers, gloves, helmet, safety glasses
6. Will parts be tacked?	7	19		tacking methods
7. Clean and position parts			8	mechanical & chemical
8. Secure parts			9	holding methods
9. Are parts properly aligned?	10	20		level, square, ruler
10. Begin welding operation			11	
11. Burn into root for penetration			12	
12. Is proper bead contour and size forming	13	21		fillet guage
13. Complege weld			14	
14. Visually inspect weld			15	
15. Are there any surface defects?	22	16		cracks, porosity
16. Shut down equipment			E.O.T.	
17. Read blueprint or drawing			2	symbols, prints

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
18. Clean each pass before welding			3	wire brush
19. Place parts in some type of positioner			7	positioning tools
20. Realign parts			10	
21. Check welding parameters			13	meters
22. Remove defective weld area			13	grinder, arc air, chisel

TASK ANALYSIS GUIDE

I. Task Statement: GMAW-ALUMINUM-PLUG-HOLE

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	14		
2. Is metal to be welded under 3/16" thick	15	3		joint design
3. Set up GMAW equipment			4	GMAW equipment
4. Select filler wire			5	reference chart
5. Put on welding safety gear			6	leathers, gloves, helmet, safety glasses
6. Remove aluminum oxide			7	mechanical & chemical clean
7. Begin hole plugging operation			8	
8. Is weld defective?	18	9		cracks, porosity
9. Turn part over			10	
10. Fill hole from backside			11	
11. Will welds needs to be ground flush?	19	12		grinder, file
12. Inspect both sides of hole			13	
13. Shut down equipment			E.O.T.	
14. Read blueprint or drawing			3	symbols, prints
15. Place back plate under hole			16	backing method
16. Weld from one side only			17	
17. Remove backup plate			8	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
18. Check welding parameters			7	meters
19. Grind welds flush			13	

TASK ANALYSIS GUIDE

I. Task Statement: GMAW--FLUX CORE-STAINLESS STEEL-T

II. Task Performance Cues: Work Order

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	19		
2. Set up FCAW Equipment			3	FCAW Equipment
3. Select proper filler metal			4	filler wire selection chart
4. Will filler metal be self shielded?	5	20		
5. Put on welding safety gear			6	leathers, gloves, helmet, safety glasses
6. Will parts be tacked?	7	21		tacking methods
7. Clean and position parts			8	mechanical & chemical
8. Secure parts			9	
9. Are parts properly aligned?	10	22		level, ruler, square
10. Begin welding parts together			11	
11. Burn into root for penetration			12	
12. Is proper bead contour and size forming	13	23		fillet weld gauge
13. Is there any undercut?	24	14		
14. Complete weld			15	
15. Chip slag			16	chipping hammer, air chisel
16. Visually inspect weld			17	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Are there any surface defects?	25	18		cracks, porosity, slag inclusions
18. Shut down equipment			E.O.T.	
19. Read blueprint or drawing			2	symbols, prints
20. Obtain and set up proper shielding gas			5	argon, argon mix
21. Place parts in some type of positioner			7	positioning tools
22. Realign parts			10	
23. Check all welding parameters			10	meters
24. Run another bead to fill undercut			14	
25. Remove defective weld area			14	

TASK ANALYSIS GUIDE

I. Task Statement: GMAW BUILD SURFACE ALLOY STEEL

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	14		
2. Prepare surface for welding			3	Clean
3. Set up GMAW equipment			4	GMAW equipment
4. Select proper filler wire			5	Reference chart
5. Select proper shielding			6	
6. Put on welding safety gear			7	gloves, leathers, helmet, safety glasses
7. Begin buildup operations			8	
8. Is part cylindrical?	15	9		holding device
9. Is proper bead size and contour forming	10	16		weld gauge
10. Will surface need to be ground when finished?	17	11		grinder
11. Visually inspect weld			12	
12. Are there any weld discontinuities?	18	13		cracks, valleys
13. Shut down equipment			E.O.T.	
14. Read blueprint or drawing			2	print, symbols
15. Control warpage during welding			9	heat control
16. Check welding parameters			7	meter

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Grind finished surface			11	
18. Remove any unacceptable weld area			7	arc air

TASK ANALYSIS GUIDE

I. Task Statement: GMAW-GALVANIZED CARBON STEEL-T-JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	20		
2. Set up GMAW equipment			3	GMAW equipment
3. Select filler wire			4	filler wire reference chart
4. Select shielding gas			5	reference chart
5. Put on welding safety gear			6	leathers, helmet, gloves, safety glasses
6. Is ventilation adequate for zinc code fumes?	7	21		
7. Will part be tacked?	8	22		
8. Clean parts			9	mechanical & chemical
9. Position part				
10. Secure parts			11	
11. Are parts aligned?	12	23		square, level, ruler, measure tools-horizontal vertical
12. Begin welding part together			13	
13. Burn into root for penetration			14	
14. Is proper bead forming?	15	24		fillet weld gauge, size contour
15. Is there any undercut?	25	16		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Complete weld			17	
17. Visually inspect weld			18	
18. Are there any weld discontinuities	26	19		cracks, porosity
19. Shut down equipment			E.O.T.	
20. Read blueprint or drawing			2	symbols, drawing, print
21. Have adequate ventilation available for zinc oxide fumes			7	
22. Place parts in some type of positioner			8	positioning tools
23. Realign parts			12	
24. Adjust welding parameters			15	meters
25. Run another bead to fill undercut			16	
26. Remove unacceptable weld area			16	grinder, arc air, torch

TASK ANALYSIS GUIDE

I. Task Statement: GMAW-BUILD WORN SURFACE-ALLOY STEEL

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	14		
2. Prepare surface for welding			3	clean
3. Set up GMAW equipment			4	GMAW . equipment
4. Select proper filler wire			5	Reference chart
5. Select proper shielding gas			6	gas types
6. Put on welding safety gear			7	gloves, helmet, leathers, safety glasses
7. Begin buildup operation			8	surfacing method
8. Is part cylindrical?	15	9		holding device
9. Is proper bead size and contour forming	10	16		Height gauge
10. Will surface need to be ground when finished?	17	11		grinder
11. Visually inspect welded surface			12	
12. Are there any weld discontinuities?	18	13		cracks, valleys
13. Shut down equipment			E.O.T.	
14. Read blueprint or drawing			2	symbols, prints
15. Control warpage during welding			9	heat control

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Check welding parameters			7	meters
17. Grind surface when finished			11	
18. Remove unacceptable welds			7	grinder, arc air

TASK ANALYSIS GUIDE

I. Task Statement: GMAW-GALVANIZED CARBON STEEL-EDGE JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is It A Verbal Order?	2	18		
2. Is Metal To Be Welded Under 3/16" Thick?	3	19		Joint Design
3. Set Up GMAW Equipment			4	GMAW Equipment
4. Select Proper Filler Metal			5	Reference Chart
5. Put On Welding Safety Gear			6	Gloves, Helmet, Leather, Safety Glasses
6. Is Ventilation Adequate for Zinc Oxide fumes?	7	20		Fans, Blowers, Ventilation
7. Will Parts Be Tacked?	8	21		Tacking Method
8. Clean and Position Parts			9	Mechanical & Chemical
9. Secure Parts			10	
10. Are Parts Properly Aligned?	11	22		Ruler, Level, Square
11. Begin Welding Operation			12	
12. Burn Into Root for Penetration			13	
13. Is Proper Bead Contour and Size Forming?	14	23		Weld Gauge
14. Complete Weld			15	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids.
	Yes	No		
15. Visually Inspect Weld			16	
16. Are There Any Weld Discontinuities?	24	17		Cracks, Porosity
17. Shut Down Equipment			EOT	
18. Read Blueprint or Drawing			2	Symbols, Print
19. Prepare Edges for Welding			3	Grinder, Arc Air Machining
20. Provide Adequate Ventilation for Zinc Oxide Fumes			7	
21. Place Parts in Some Type of Positioner			8	Positioning Tools
22. Realign Parts			11	
23. Check Welding Parameters			14	Meters
24. Remove Any Unacceptable Weld Area			14	Grinder, Arc Air

TASK ANALYSIS GUIDE

I. Task Statement: GMAW-GALVANIZED CARBON STEEL-CORNER JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is It A Verbal Order?	2	18		
2. Set Up GMAW Equipment			3	GMAW Equipment
3. Select Proper Filler Metal			4	Reference Chart
4. Put Welding Safety Gear			5	Gloves, Helmet, Leather, Safety Glasses
5. Is Ventilation Adequate for Zinc Oxide Fumes?	6	19		Proper Ventilation
6. Will Edges Need To Be Weld Prepped?	20	7		Joint Design
7. Will Parts Be Tacked?	8	21		Tacking Method
8. Clean and Position Parts			9	Mechanical & Chemical
9. Secure Parts			10	
10. Are Parts Properly Aligned?	11	22		Ruler, Square, Level
11. Begin Welding Operation			12	
12. Burn Into Root for Penetration			13	
13. Is Proper Bead Contour and Size Forming?	14	23		Fillet Weld
14. Complete Weld			15	
15. Visually inspect weld.			16	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Are There Any Surface Discontinuities?	24	17		Cracks, Porosity
17. Shut Down Equipment			EOT	
18. Read Blueprint or Drawing			2	Symbols, Prints
19. Provide Adequate Ventilation for Zinc Oxide Fumes			6	Zinc Oxide Poisoning
20. Prepare Edges for Welding			7	Grinder, Arc Air Machining
21. Place Parts in Some Type of Positioner			8	
22. Realign Parts			11	
23. Check and Adjust Welding Parameters			14	Meter
24. Remove Unacceptable Weld Area			14	

TASK ANALYSIS GUIDE

I. Task Statement: GMAW-GALVANIZED CARBON STEEL-BUTT JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is It A Verbal Order?	2	21		
2. Is Metal To Be Welded Under 3/16" Thick?	3	22		Joint Design
3. Set Up GMAW Equipment			4	GMAW Equipment
4. Select Filler Metal			5	Reference Chart
5. Will Backing Strip Be Used?	23	6		Backing Materials
6. Will Parts Be Tacked?	7	24		Tacking Methods
7. Is Ventilation Adequate for Zinc Oxide Fumes?	8	25		Proper Ventilation
8. Put On Welding Safety Gear			9	Helmet, Gloves, Leather, Safety Glasses
9. Clean and Position Parts			10	Mechanical & Chemical
10. Secure Parts			11	
11. Are Parts Properly Aligned?	12	26		Rules, Square, Level
12. Begin Welding Operation			13	
13. Burn Into Root for Complete Penetration			14	
14. Key Hole the Puddle			15	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
15. Is Proper Bead Forming	16	27		Size Contour
16. Complete the Weld			17	
17. Visually Inspect Weld			18	
18. Are There Any Surface Defects?	28	19		Cracks, Porosity
19. Is Joint Full To Surface?	20	29		Underfill
20. Shut Down Equipment			EOT	
21. Read Blueprint or Drawing			2	Symbols, Prints
22. Prepare Edges for Welding			3	Grinder, Arc Air
23. Tack Backup Strip In Place			6	
24. Place Parts In Some Type of Positioner			7	Positioning Tools
25. Have Adequate Ventilation Available for Zinc Oxide Fumes			8	
26. Realign Parts			12	
27. Check and Adjust Welding Parameters			16	Meters
28. Remove Unacceptable Weld Area			16	Arc Air, Grinder
29. Make Another Weld Pass			19	

TASK ANALYSIS GUIDE

I. Task Statement: GMAW--BUILD UP WORN PARTS--HARD SURFACE

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a Verbal Order?	2	21		
2. Prepare surface for welding			3	
3. Set up GMAW equipment			4	
4. Select proper filler wire			5	
5. Select proper Shielding gas			6	
6. Put on welding safety gear			7	
7. Begin build-up operation			8	
8. Is part cylindrical?	22	9		
9. Is proper bead size and contour forming?	10	23		
10. Will surface need to be ground when finished?	24	11		
11. Visually inspect weld			12	
12. Are there any weld discontinuities?	25	13		
13. Change filler wire for hardsurfacing			14	
14. Will Shielding gas need changed?	26	15		
15. Prepare part for hardsufacing operation			16	
16. Begin hard surface operating			17	
17. Is proper bead size and contour forming?	27	18		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
18. Visually inspect weld			19	
19. Are there any weld discontinuities?	28	20		
20. Shut down equipment			EOT	
21. Read blueprint or drawing			2	
22. Control Warpage during welding			9	
23. Check welding parameters			10	
24. Grind finished surface			11	
25. Remove unacceptable weld area			7	
26. Obtain proper Shielding gas			15	
27. Check welding parameters			16	
28. Remove unacceptable weld area			16	

TASK ANALYSIS GUIDE

I. Task Statement: GMAW--BUILDING WORN SURFACE--ALUMINUM

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a Verbal Order?	2	14		
2. Prepare surface for welding			3	
3. Set up GMAW equipment			4	
4. Select proper filler wire			5	
5. Select proper Shielding Gas			6	
6. Put on welding safety gear			7	
7. Begin build up operation			8	
8. Is part cylindrical?	15	9		
9. Is proper bead size and contour forming?	10	16		
10. Will surface need to be ground when finished?	17	11		
11. Visually inspect welded surface			12	
12. Are there any weld discontinuities?	13	18		
13. Shut down equipment			EOT	
14. Read blueprint or drawing			2	
15. Control warpage during welding			9	
16. Check welding parameters			7	
17. Grind surface when finished			11	
18. Remove unacceptable weld area			7	

TASK ANALYSIS GUIDE

I. Task Statement: GMAW--CAST IRON--BUTT JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal Order?	2	15		
2. Set up GMAW equipment			3	
3. Select filler metal			4	
4. Prepare edges for welding Cast Iron			5	
5. Can part be preheated?	6	16		
6. Preheat part to proper temperature			7	
7. Put on welding safety gear			8	
8. Begin welding operation			9	
9. Use Butter method			10	
10. Complete the weld			11	
11. Peen the weld			12	
12. Allow part to cool slowly			13	
13. Are there any cracks?	17	14		
14. Shut down equipment			EOT	
15. Read blueprint or drawing			2	
16. Weld very little at a time			7	
17. Repeat process more carefully			6	

TASK ANALYSIS GUIDE

I. Task Statement: GMAW--HARD SURFACE STEEL

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	11		
2. Set up GMAW equipment			3	
3. Select proper filler wire			4	
4. Put on Welding safety gear			5	
5. Will only one layer be required?	6	12		
6. Begin surfacing operation			7	
7. Is proper size bead and contour forming?	8	13		
8. Visually inspect sufaced area			9	
9. Are there any weld discontinuities	14	10		
10. Shut down equipment			EOT	
11. Read blueprint or drawing			3	
12. Use cross hatching method			6	
13. Check welding parameters			8	
14. Remove unacceptable weld area			6	

TASK ANALYSIS GUIDE

I. Task Statement: G MAW -FLUX CORE-STAINLESS STEEL-EDGE JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	19		
2. Is metal to be welded under 3/16" thick	3	20		joint design
3. Set up FCAW Equipment			4	FCAW Equipment
4. Select proper filler metal			5	Reference chart
5. Will filler metal be self shielded?	6	21		
6. Put on welding safety gear			7	leathers, gloves, helmet, safety glasses
7. Will parts be tacked?	8	22		tacking methods
8. Clean and position parts			9	mechanical & chemical
9. Secure parts			10	
10. Are parts properly aligned?	11	23		ruler, square, level
11. Begin welding operation			12	
12. Burn into root for penetration			13	
13. Is proper bead size and contour forming	14	24		fillet weld gauge
14. Complete weld			15	
15. Chip slag			16	chipping hammer, air chisel
16. Visually inspect weld			17	
17. Are there any surface defects?	25	18		cracks, porosity, slag inclusion

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
18. Shut down equipment			E.O.T.	
19. Read blueprint or drawing			2	symbols, print
20. Prepare edges for welding			3	grinder, arc air, machining
21. Obtain proper shielding gas			6	argon, argon mix
22. Place parts in some type of positioner			8	positioning tocls
23. Realign parts			11	
24. Check all welding parameters			14	meters
25. Remove defective weld area			14	grinder, arc air

TASK ANALYSIS GUIDE

I. Task Statement: GMAW - FLUX CORE--STAINLESS STEEL--CORNER JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	18		
2. Set up FCAW equipment.			3	FCAW equipment
3. Select proper filler metal.			4	Filler wire selection chart
4. Is filler metal self shielded?	5	19		
5. Will edges need to be weld prepped?	20	6		Joint design
6. Put on welding safety gear.			7	Helmet, gloves, leathers, safety glasses
7. Will parts be tacked?	8	21		
8. Clean and position parts.			9	Mechanical - chemical
9. Secure parts.			10	
10. Are parts properly aligned?	11	22		Level, square, ruler
11. Begin welding operation.			12	
12. Burn into root for penetration.			13	
13. Is proper bead size and contour forming?	14	23		Fillet weld gauge
14. Complete weld.			15	
15. Visually inspect weld.			16	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Are there any surface weld defects?	24	17		Cracks, porosity, slag inclusion
17. Shut down equipment.			EOT	
18. Read Blueprint or drawing.			2	Symbols, prints
19. Obtain proper shielding gas.			5	Argon, Argon mix
20. Prepare edges for welding.			6	Grinder, torch, machine
21. Place parts in some type of positioner.			8	Positioning tool
22. Realign parts.			11	
23. Check welding parameters.			14	Meters
24. Remove Defective weld area.			14	Grinder, arc air

TASK ANALYSIS GUIDE

I. Task Statement: GMAW - FLUX CORE-STAINLESS STEEL-BUTT JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	21		
2. Is metal to be welded under 3/16" thick?	3	22		Measuring device
3. Set up FCAW equipment.			4	FCAW equipment
4. Select proper filler metal.			5	Selection chart
5. Is filler metal self-shielded?	6	23		
6. Put on welding safety gear.			7	Gloves, helmet, leathers
7. Will backing strip be used?	24	8		Types of backing strips
8. Will parts be tacked?	9	25		
9. Clean and position parts.			10	Wire brush, grinder, file
10. Secure parts.			11	
11. Are parts properly aligned?	12	26		Level, square, ruler
12. Begin welding operation.			13	
13. Burn into root for complete penetration.			14	
14. Keyhole the puddle.			15	
15. Is proper bead size and contour forming?	16	27		Fillet weld gauge
16. Complete the weld.			17	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Chip slag.			18	Chipping hammer, air chisel
18. Visually inspect the weld.			19	
19. Are there any surface defects?	28	20		Cracks, porosity slag inclusion
20. Shut down equipment.			E.O.T.	
21. Read the blueprint or drawing.			2	Symbols, print, drawing
22. Prepare edges for welding.			3	Grinder, Arc Air, Nibbler
23. Select proper shielding gas.			6	Argon, argon mix
24. Place backing strip in proper place.			8	
25. Place parts in some type of positioner.			9	Positioning tacks
26. Realign parts.			12	
27. Check welding parameters.			16	Reference chart
28. Remove defective weld area.			16	Grinder, arc air

TASK ANALYSIS GUIDE

I. Task Statement: GMAW--FLUX CORE--STAINLESS STEEL-LAP JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	18		
2. Will joint require more than one pass?	19	3		Joint Design
3. Set up FCAW Equipment			4	FCAW Equipment
4. Will filler wire be self-shielded	5	20		Reference chart
5. Put on welding safety gear			6	Leather gloves, helmet, safety glasses
6. Will parts be tacked?	7	21		
7. Clean and position parts			8	Mechanical & chemical
8. Secure parts			9	
9. Are parts properly aligned?	10	22		Ruler, square, level
10. Begin welding operation			11	
11. Burn into root for complete penetration			12	
12. Is proper bead contour and size forming?	13	24		Filler weld gauge
13. Complete the weld			14	
14. Chip slag			15	Chipping hammer air chisel
15. Visually inspect the weld			16	
16. Are there any surface defects?	23	17		Cracks, porosity slang inclusion

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Shut down the equipment			EOT	
18. Read the blueprint or drawing .			2	Symbols, prints
19. Use Multi-pass method for proper size weld.			3	Weave, stringer
20. Obtain proper shielding gass			5	Argon, argon mix CO_2, mix
21. Place parts on some type of positioner			7	Positioning tool
22. Realign parts			10	
23. Remove defective weld area			13	Grinder, arcair
24. Check welding parameters			13	Meters, flowmeters

TASK ANALYSIS GIDE

I. Task Statement: GMAW—CAST IRON--HARD SURFACE

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	15		
2. Set up GMAW equipment.			3	GMAW equipment
3. Select filler metal.			4	Reference chart
4. Prepare surface for welding.			5	Mechanical and Chemical
5. Will only one layer be required?	6	16		Surfacing method
6. Can part be preheated?	7	17		Preheat method
7. Preheat part to proper temperature.			8	
8. Put on welding safety gear.			9	Helmet, gloves, leather, safety glasses
9. Begin surfacing operation.			10	
10. Is proper bead size and contour forming?	11	18		
11. Complete the weld.			12	
12. Peen the weld.			13	Stress relieve
13. Allow part to cool slowly.			14	Post heat
14. Shut down equipment.			EOT	
15. Read blueprint or drawing.			2	Symbols, print
16. Use cross hatching method.			6	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Weld very little at a time.			8	
18. Check welding parameters.			9	Meters

TASK ANALYSIS GUIDE

I. Task Statement: GMAW -HARDFACE ALLOY STEEL

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	12		
2. Will surface be only one layer thick?	3	13		Print, spec.
3. Set up GMAW equipment.			4	GMAW equipment
4. Select filler wire.			5	Reference chart
5. Select shielding gas.			6	Gas types
6. Put on welding safety gear.			7	Gloves, helmet, leathers, safety glasses
7. Begin surfacing operation.			8	
8. Are welds proper size and contour?	9	14		Weld Gauge
9. Are there any weld discontinuities?	15	10		Cracks, valleys
10. Visually inspect surfaced area.			11	
11. Shut down equipment.			EOT	
12. Read blueprint or drawing.			2	Symbols
13. Use cross hatching method.			3	
14. Check welding parameters.			7	Meters
15. Remove unacceptable weld area.			7	Grinder, arc air

TASK ANALYSIS GUIDE

I. Task Statement: GMAW - BUILD UP WORN PART BEFORE APPLYING HARD SURFACING MATERIAL

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	14		
2. Prepare surface for welding.			3	Clean
3. Set up GMAW equipment.			4	GMAW equipment
4. Select proper filler wire.			5	Reference chart
5. Select proper shielding gas.			6	Gas types
6. Put on welding safety gear.			7	Helmet, gloves, leathers, safety glasses
7. Begin Build up operation.			8	Surfacing method
8. Is part cylindrical?	15	9		Holding device
9. Is proper bead size and contourforming?	10	16		Height gauge
10. Will surface need to be ground when finished?	17	11		Grinder
11. Visually inspect welded surface.			12	
12. Are there any weld discontinuities?	18	13		Cracks, valleys
13. Shut down equipment.			EOT	
14. Read blueprint or drawing.			2	Symbols, prints
15. Control warpage during welding.			9	Heat control

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Check welding parameters			7	Meters
17. Grind finished surface.			11	Grinder
18. Remove unacceptable weld area.			7	Arc Air

TASK ANALYSIS GUIDE

I. Task Statement: GMAW - CAST IRON--CORNER JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is it a verbal order?	2	15		
2. Set up GMAW equipment.			3	GMAW equipment
3. Select filler metal.			4	Reference chart
4. Prepare edges for welding cast iron.			5	Grinder, arc air machining
5. Can part be preheated?	6	16		Preheat procedure
6. Preheat part to proper temperature.			7	
7. Put on welding safety gear.			8	Helmet, gloves, leathers, safety glasses
8. Begin welding operation.			9	
9. Use buttering method.			10	
10. Complete the weld.			11	
11. Peen the weld.			12	Stress relieve
12. Allow part to cool slowly.			13	
13. Are there any cracks?	17	14		Grinder, arc air
14. Shut down equipment.			EOT	
15. Read blueprint or drawing.			2	Symbols, prints

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Weld small amount at a time.			7	
17. Repeat process.			6	

TASKS BY JERRY YARGER

The following section contains the tasks written by Jerry Yarger. The tasks are outlined on this sheet. You will find the tasks in this section to be in the order as listed below.

CHECK WELD JOINT PREPARATION
DRILL METAL WITH DRILL PRESS
FABRICATE PART TO BLUEPRINT SPECIFICATIONS
CUT METAL WITH SHEAR
MARK WHERE METAL IS TO BE CUT
MARK METAL WHERE HOLE IS TO BE DRILLED
MARK WHERE METAL IS TO BE BENT
CUT METAL WITH ABRASIVE CUT OFF SAW
FABRICATE FIXTURE TO HOLD PART
MARK WHERE METAL PARTS ARE TO JOIN
PUNCH METAL WITH PUNCH PRESS
FORM METAL WITH BRAKE PRESS
CUT METAL WITH POWER HACK SAW
CUT METAL WITH BAND SAW
SPOT WELD LAP JOINT STAINLESS STEEL
SPOT WELD LAP JOINT MILD STEEL
INSPECT WELDS WITH DYE PENETRANTS
CHECK WELDMENTS FOR CRACKS USING MAGNS-FLUX EQUIPMENT
SPOT WELD LAP JOINT GALVANIZED STEEL
CARBON ARC AIR-CUT METAL TO SPECIFICATIONS ON ALLOY STEEL
BUILD SURFACE OF ALLOY STEEL TO SIZE WITH THE OXY-ACETYLENE PROCESS
SPOT WELD LAP JOINT LAP JOINT ALUMINUM
CARBON ARC AIR-AND BACKGOUGE-ON CAST IRON
FUSION WELDING COPPER ALLOYS LAP JOINT
FUSION WELDING COPPER ALLOYS TEE JOINT

TASK ANALYSIS GUIDE

I. Task Statement: CHECK WELDING JOINT PREPARATION

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	8		verbal, print, work order
2. Obtain the metal to be checked.			3	
3. Are the pieces the proper size?	4	9		rule, tape, gage
4. Is the metal clean?	5	11		
5. Measure for correct angle on prepared joint			6	
6. Measure land size			7	
7. Check metal for warpage			E.O.T.	
8. Read work order			2	
9. Scrap the metal			10	
10. Obtain metal the proper size			4	
11. Clean the metal			5	wire brush

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
12. Clamp workpiece in holding device			4	
13. Can workpiece be salvaged?	1	14		
14. Scrap workpiece			1	

TASK ANALYSIS GUIDE

I. Task Statement:

DRILL METAL WITH DRILL PRESS

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Read blueprint			2	
2. Has hole to be drilled been layed out?	3	11		
3. Has workpiece been clamped in holding device?	4	13		
4. Secure drill bit			5	
5. Determine feed and speed for workpiece			6	
6. Is cutting fluid required?	7	8		
7. Provide cutting fluid			8	
8. Drill hole			9	
9. Does hole meet blueprint specifications?	10	14		
10. Return tools and clean up			E.O.T.	
11. Layout hole			12	
12. Center punch layout			3	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
13. Clamp workpiece in holding device.			4	
14. Can workpiece be salvalged	1	15		
15. Scrap workpiece.			1	

TASK ANALYSIS GUIDE

I. Task Statement:

CUT METAL WITH SHEAR

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	14		verbal, print, work order
2. Determine thickness of metal to be sheared			3	U.S standard sheet and plate gauge
3. Check shear capacity			4	refer to operator's manual
4. Set shear for cutting action			5	single, repeat
5. Set the back or front gauge to the desired width of cut			6	
6. Is metal layed out to specification?	7	15		
7. Put on safety clothing			8	safety glasses
8. Is the area free from hazards?	9	16		
9. Insert metal			10	
10. Turn on shear			11	
11. Make cut			12	
12. Does the cut meet specifications?	13	17		
13. Turn off shear			E.O.T.	
14. Read work order			2	
15. Correct layout			7	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Make area free from hazards			9	
17. Re-cut to specification			13	

TASK ANALYSIS GUIDE

I. Task Statement: MARK WHERE METAL IS TO BE CUT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. **Is the work order verbal?**	**2**	**8**		**verbal, print, work order**
2. **Obtain the stock**			**3**	
3. **Obtain the necessary layout tools**			**4**	**rule, tape soapstone, scratch all,** square
4. **Lay out workpiece**			**5**	
5. **Does layout meet specifications?**	**6**	**9**		
6. **Return layout tools**			**7**	
7. **Clean-up**			**EOT**	
8. **Read work order**			**2**	
9. **Correct layout**			**6**	

TASK ANALYSIS GUIDE

I. Task Statement: MARK METAL WHERE HOLE IS TO BE DRILLED

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Read blueprint			2	
2. Can reference points be measured from?	3	10		
3. Apply bluing to workpiece			4	
4. Secure layout tools to be used			5	Tape, center punch, square, etc.
5. Layout workpiece			6	
6. Does layout meet blueprint specifications?	7	8		
7. Return tools and clean up			E.O.T.	
8. Can workpiece be salvaged?	1	9		
9. Scrap workpiece			1	
10. Machine workpiece for securing reference points			3	

TASK ANALYSIS GUIDE

I. Task Statement: MARK WHERE METAL IS TO BE BENT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	8		verbal, print, work order
2. Obtain the stock.			3	
3. Obtain the necessary layout tools.			4	rule, tape, soapstone, scratch awl, square
4. Lay out workpiece.			5	
5. Does layout meet specifications?	6	9		
6. Return layout tools.			7	
7. Clean-up			EOT	
8. Read work order.			2	
9. Correct layout.			6	

TASK ANALYSIS GUIDE

I. Task Statement:

CUT METAL WITH ABRASIVE CUT-OFF SAW

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	19		verbal, print, work order
2. Read the print			3	
3. Obtain the necessary layout tools			4	Rule, tape, soapstone, scratch awl
4. Obtain stock which is to be cut			5	
5. Layout correct linear dimension on stock			6	
6. Return layout tools			7	
7. Clamp up stock into abrasive cut off machine			8	
8. Does the blade line up with layout marks on correct side of line?	9	20		
9. Put on safety equipment			10	
10. Turn on power			11	
11. Engage cutting wheel into stock			12	

TASK ANALYSIS GUIDE

	TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
		Yes	No		
12.	Is the abrasive wheel removing the stock with a smooth cut?	13	21		
13.	Continue cutting until cut is complete			14	
14.	Raise cutting head			15	
15.	Shut off power			16	
16.	Remove stock from machine			17	
17.	Is stock out to proper specification?	18	23		
18.	Clean off machine			E.O.T.	
19.	Read the work order			2	
20.	Readjust the stock, so that blade cuts on proper side of line			9	
21.	Check wheel for specifications needed for type of material			22	type, size
22.	Replace wheel , if needed			13	
23.	Remove stock			4	

TASK ANALYSIS GUIDE

I. Task Statement: FABRICATE FIXTURE TO HOLD PART

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Obtain print.			2	print, work order
2. Study the print.			3	
3. Check the bill of materials.			4	
4. Obtain the stock.			5	
5. Cut or shear stock to size.			6	
6. Prepare joints.			7	grinder
7. Position parts.			8	positioning tool
8. Tack parts.			9	
9. Are the parts aligned accurately?	10	13		
10. Weld fixture.			11	
11. Final inspection and testing.			12	
12. Clean-up.			EOT	
13. Realign properly.			10	

TASK ANALYSIS GUIDE

I. Task Statement: MARK WHERE METAL PARTS ARE TO JOIN

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	8		verbal, print, work order
2. Obtain the stock.			3	
3. Obtain the necessary layout tools.			4	rule, tape, soapstone, scratch awl, square
4. Lay out workpiece.			5	
5. Does layout meet specifications?	6	9		
6. Return layout tools.			7	
7. Clean-up			EOT	
8. Read work order.			2	
9. Correct layout.			6	

TASK ANALYSIS GUIDE

I. Task Statement: PUNCH METAL WITH PUNCH PRESS

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	14		verbal, print, work order
2. Obtain stock which is to be punched.			3	
3. Does stock need to be layed out?	15	4		
4. Put blank in dye.			5	
5. Is the blank aligned in the dye?	6	16		
6. Put on safety equipment.			7	safety glasses
7. Is work area free from hazards?	8	17		
8. Turn on power.			9	
9. Engage the press and complete operation.			10	
10. Shut off power.			11	
11. Remove blank from machine.			12	
12. Is the blank punched to specifications?	13	18		
13. Clean off machine.			E.O.T.	
14. Read the work order.			2	
15. Lay out stock.			4	
16. Realign blank.			6	
17. Make area free from hazards.			8	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
18. Correct specifications.			19	
19. Weld up-hole and relocate the layout to correct spec.			20	
20. Repunch blank			13	

TASK ANALYSIS GUIDE

I. Task Statement: FORM METAL WITH BRAKE PRESS.

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	15		verbal, print, work order
2. Obtain the stock.			3	
3. Obtain the necessary layout tools.			4	
4. Lay out workpiece.			5	
5. Does layout meet specifications?	6	16		
6. Return layout tools.			7	
7. Determine thickness of metal.			8	
8. Set brake for thickness.			9	
9. Insert metal into brake.			10	
10. Start the bend.			11	
11. Is the bend starting to form on the layout line?	12	17		
12. Complete bend.			13	
13. Is the metal formed to meet specifications?	14	19		
14. Clean up.			E.O.T.	
15. Read the work order.			2	
16. Correct layout.			6	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Can workpiece be salvaged?	18	2		
18. Realign workpiece.			10	
19. Remove stock.			2	

TASK ANALYSIS GUIDE

I. Task Statement:

CUT METAL WITH POWER HACK SAW

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Read blueprints			2	
2. Has workpiece been layed out?	3	12		
3. Clamp workpiece in holding device			4	
4. Determine blade required for workpiece			5	type, size
5. Determine cutting speed			6	
6. Start the saw			7	
7. Is cutting fluid required?	8	9		
8. Provide cutting fluid			9	
9. Cut workpiece			10	
10. Does workpiece meet blueprint specifications?	11	13		
11. Return tools and clean up			E.O.T.	
12. Layout workpiece			3	
13. Can workpiece be salvaged?	1	14		
14. Scrap workpiece			1	

TASK ANALYSIS GUIDE

I. Task Statement:

CUT METAL WITH BAND SAW

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Read blueprint			2	
2. Has workpiece been layed out?	3	13		
3. Clamp workpiece in holding device			4	
4. Determine saw blade required for workpiece			5	type, size check operator's manual
5. Determine cutting speed			6	
6. Adjust cutting guard for cut			7	
7. Start the saw			8	
8. Is cutting fluid required?	9	10		
9. Provide cutting fluid			10	
10. Cut workpiece			11	
11. Does workpiece meet blueprint specifications?	12	14		
12. Return tools and clean up			E.O.T.	
13. Layout workpiece			3	
14. Can workpiece be salvaged?	1	15		
15. Scrap workpiece			1	

TASK ANALYSIS GUIDE

I. Task Statement: **SPOT WELD LAP JOINT STAINLESS STEEL**

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	16		verbal, print, work order
2. Obtain the steel.			3	
3. Is the correct machine setting known?	4	17		Check the spot welding manual
4. Set up the equipment.			5	
5. Put on safety equipment.			6	Safety glasses, gloves
6. Clean the metal.			7	wire brush
7. Obtain fixture if needed.			8	
8. Align the steel pieces.			9	
9. Put the steel between the electrodes.			10	
10. Is the clamping pressure correct?	11	18		
11. Turn on spot welder.			12	
12. Make the weld.			13	
13. Did the spot weld complete fusion?	14	19		
14. Does the spot weld meet specifications?	15	20		
15. Turn off equipment.			E.O.T.	
16. Read work order.			2	
17. Get instructions from supervisor.			4	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
18. Tighten pressure between electrodes.			11	manual
19. Increase hold time.			12	
20. Correct procedures to meet specifications.			15	

TASK ANALYSIS GUIDE

I. Task Statement: SPOT WELD LAP JOINT MILD STEEL

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	16		verbal, print, work order
2. Obtain the steel.			3	
3. Is the correct machine setting known?	4	17		Check the spot welding manual
4. Set up the equipment.			5	
5. Put on safety equipment.			6	Safety galsses, gloves
6. Prepare the steel for welding.			7	Wire brush
7. Is a fixture needed?	18	8		
8. Align the steel pieces.			9	
9. Put steel between electrodes.			10	
10. Is the clamping pressure correct?	11	19		
11. Turn on spot welder.			12	
12. Make the weld.			13	
13. Did the spot complete fusion?	14	20		
14. Does the spot weld meet specifications?	15	21		
15. Turn off equipment.			E.O.T.	
16. Read work order.			2	
17. Get instructions from supervisor.			4	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
18. Obtain a fixture.			8	
19. Check manual, tighten pressure between electrodes.			11	
20. Increase hold time.			12	
21. Correct specifications.			15	

TASK ANALYSIS GUIDE

I. Task Statement: INSPECT WELDS WITH DYE PENETRANTS

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	17		verbal, print, work order
2. Obtain the weld.			3	
3. Obtain the dye penetrant.			4	
4. Do you know how to use the dye penetrant?	5	18		operating instructions
5. Take out the cleaner.			6	
6. Spray cleaner on weld to be checked.			7	
7. Wipe dry with a clean cloth.			8	
8. Is the weld clean?	9	19		
9. Allow time to dry.			10	
10. Spray penetrant on the weld.			11	
11. Is all of the weld covered with penetrant?	12	20		
12. Allow penetrant to penetrate.			13	10-20 minutes
13. Wipe the surface clean with a cloth.			14	
14. Spray a thin and even coat of developer on the weld.			15	
15. Let the developer dry.			16	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Inspect the weld for defects.			E.O.T.	
17. Read the work order.			2	
18. Read the operating instructions.			5	
19. Reclean the weld with the cleaner.			7	
20. Spray more penetrant on the weld.			12	

TASK ANALYSIS GUIDE

I. Task Statement: CHECK WELDMENTS FOR CRACKS USING MAGNA-FLUX EQUIPMENT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	11		verbal, print, work order
2. Obtain the weld.			3	
3. Clean the weld.			4	Wire brush
4. Obtain the magnaflux kit.			5	
5. Is the kit complete?	6	12		Check operating instructions
6. Put magnet over area to be checked.			7	
7. Sprinkle magnetic flux on the weld.			8	
8. Remove magnet.			9	
9. Blow the flux off of the weld.			10	
10. Mark any area that shows a crack.			E.O.T.	Punch, soapstone, scratch aw
11. Read work order.			2	
12. Obtain equipment needed.			6	

TASK ANALYSIS GUIDE

I. Task Statement: SPOT WELD LAP JOINT GALVANIZED STEEL

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	16		verbal, print, work order
2. Obtain the steel.			3	
3. Is the correct machine setting known?	4	17		Check the spot welding manual
4. Set up the equipment.			5	
5. Put on safety equipment.			6	Safety glasses, gloves
6. Clean the metal.			7	Wire brush
7. Obtain fixture if needed.			8	
8. Align the steel pieces.			9	
9. Put the steel between the electrodes.			10	
10. Is the clamping pressure correct?	11	18		
11. Turn on spot welder.			12	
12. Make the weld.			13	
13. Did the spot weld complete fusion?	14	19		
14. Does the spot weld meet specifications?	15	20		
15. Turn off equipment.			E.O.T.	
16. Read work order.			2	
17. Get instructions from supervisor.			4	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
18. Tighten pressure between electrodes.			11	manual
19. Increase hold time.			12	
20. Correct weld to specifications.			15	

TASK ANALYSIS GUIDE

I. Task Statement:

CARBON ARC AIR-CUT METAL TO SPECIFICATION ON ALLOY STEEL

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	17		verbal, print, work order
2. Determine where metal is to be cut			3	
3. Determine power source			4	
4. Determine electrode			5	check carbon arc air electrode chart
5. Determine air pressure			6	
6. Set up equipment			7	refer to operator's manual
7. Set the amperage			8	
8. Set polarity			9	
9. Is work area free from hazards?	10	18		
10. Is the part in position?	11	19		positioning tool
11. Put on safety clothing and welding gear			12	safety glasses, lens, ear plugs, leathers, helmet, gloves

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
12. Insert electrode			13	
13. Check cutting parameters			14	
14. Begin cutting			15	
15. Do all variables meet specifications?	16	20		
16. Complete cutting			E.O.T.	
17. Read work order			2	
18. Make area free from hazards			10	
19. Position part			11	
20. Correct cutting specifications			16	

TASK ANALYSIS GUIDE

I. Task Statement: BUILD SURFACE OF ALLOY STEEL TO SIZE WITH OXY-ACET

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	18		verbal, print, work order
2. Obtain work piece.			3	
3. Determine amount of build-up to be done.			4	
4. Determine alloy and proper filler wire.			5	check wire chart
5. Obtain the filler wire.			6	
6. Set up oxy-acet equipment.			7	check operator's manual
7. Determine welding position.			8	positioning tool
8. Put on safety clothing and welding gear.			9	goggles, gloves
9. Clean the surface.			10	wire brush
10. Does part need to be pre-heated?	19	11		
11. Determine extent of welding to be done.			12	
12. Determine size of build-up needed.			13	
13. Begin welding.			14	
14. Are all of the welding variables correct?	15	20		
15. Is there a uniform build-up forming?	16	21		
16. Does the build-up meet specifications?	17	22		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
17. Shut down equipment.			E.O.T.	
18. Read print.			2	
19. Pre-heat part.			11	
20. Correct welding variables.			15	
21. Correct welding technique.			16	
22. Remove defective build-up.			23	
23. Reweld defective area.			16	

TASK ANALYSIS GUIDE

I. Task Statement: SPOT WELD LAP JOINT ALUMINUM

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	16		verbal, print, work order
2. Obtain the aluminum.			3	
3. Do you know how to set the machine?	4	17		check the spot welding manual
4. Set up the equipment.			5	
5. Put on safety equipment.			6	safety glasses, gloves
6. Clean the metal.			7	stainless steel wire brush
7. Obtain fixture if needed.			8	
8. Align the aluminum pieces.			9	
9. Put the aluminum between the electrodes.			10	
10. Is the clamping pressure correct?	11	18		
11. Turn on spot welder.			12	
12. Make the weld.			13	
13. Did the spot weld complete fusion?	14	19		
14. Does the spot weld meet specifications?	15	20		
15. Turn off equipment.			E.O.T.	
16. Read work order.			2	
17. Get instructions from supervisor.			4	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
18. Check manual, tighten pressure between electrodes.			11	
19. Increase hold time.			12	
20. Correct weld to specifications.			15	

TASK ANALYSIS GUIDE

I. Task Statement:

CARBON ARC AIR AND BACKGOUGE-ON CAST IRON

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	18		verbal, print, work order
2. Determine thickness of metal			3	
3. Determine power source			4	
4. Determine electrode			5	check carbon arc air-electrode chart
5. Determine air pressure			6	
6. Set up equipment			7	refer to operator's manual
7. Set the amperage			8	
8. Set polarity			9	
9. Is work area free from hazards?	10	19		
10. Is part in position for gouging?	11	20		positioning tool
11. Put on safety clothing and welding gear			12	safety glasses, lens, ear plugs, leathers, helmet, gloves

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
12. Insert electrode			13	
13. Check cutting parameters			14	
14. Determine extent of backgouge			15	length, width, depth
15. Begin backgouging			16	
16. Do all variables meet specifications?	17	21		
17. Complete gouging			E.O.T.	
18. Read print			2	
19. Make area free from hazards			10	
20. Reposition part			11	
21. Correct gouging variables			17	

TASK ANALYSIS GUIDE

I. Task Statement: CARBON ARC AIR-REMOVE EXCESSIVE CAST ALLOY

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	17		verbal, print, work order
2. Determine amount of alloy to be removed			3	length, width, depth
3. Determine power source			4	
4. Determine electrode			5	check carbon arc air electrode chart
5. Determine air pressure			6	
6. Set up equipment			7	refer to operator's manual
7. Set the amperage			8	
8. Set polarity			9	
9. Is work area free from hazards?	10	18		
10. Is part in position for gouging?	11	19		positioning tool
11. Put on safety clothing and welding gear			12	safety glasses, lens, ear plugs, leathers, helmet, gloves

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
12. Insert electrode			13	
13. Check cutting parameters			14	
14. Begin gouging			15	
15. Do all variables meet specifications?	16	20		
16. Complete gouging			E.O.T.	
17. Read print			2	
18. Make area free from hazards			10	
19. Reposition part			11	
20. Correct gouging variables			16	

TASK ANALYSIS GUIDE

I. Task Statement:

G.T.A.W. COPPER ALLOY LAP JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	20		
2. Obtain the copper pieces with which to make the weld			3	
3. Is filler wire needed?	4	5		
4. Obtain the filler wire			5	wire chart
5. Set up G.T.A.W. equipment			6	check operator's manual
6. Determine welding position			7	positioning tool
7. Put on safety clothing and welding gear			8	safety glasses, lens, helmet, gloves
8. Prepare copper for welding			9	wire brush
9. Set up weld joint			10	
10. Tack joint together			11	
11. Does joint meet specifications?	12	21		
12. Determine extent of welding to be done			13	verbal, print, work order
13. Determine depth of fusion			14	
14. Determine size of weld			15	
15. Begin welding			16	

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
16. Are all of the welding variables correct?	17	23		
17. Is there a uniform bead structure forming?	18	24		
18. Does the weld meet specifications?	19	25		
19. Turn off equipment			E.O.T.	
20. Read print			2	
21. Remove tack welds			22	
22. Realign joint			10	
23. Correct welding variables			17	
24. Correct welding technique			18	
25. Remove defective weld			26	
26. Reweld defective area			18	

TASK ANALYSIS GUIDE

I. Task Statement:

G.T.A.W. COPPER ALLOY TEE JOINT

II. Task Performance Cues:

III. Task Performance Procedures:

A. When a decision must be made, indicate alternatives as "Yes-No" answers to questions.

B. List performance steps by most frequently occurring sequence.

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
1. Is the work order verbal?	2	22		
2. Obtain the copper pieces for making the weld			3	
3. Is filler wire needed?	4	5		
4. Obtain the filler wire			5	check proper chart
5. Set up G.T.A.W. equipment			6	check operator's manual
6. Determine welding position			7	positioning tool
7. Put on safety clothing and welding gear			8	safety glasses, lens, helmet, gloves
8. Prepare copper for welding			9	wire brush
9. Set up weld joint			10	
10. Tack joint together			11	
11. Does joint meet specifications?	12	23		

TASK ANALYSIS GUIDE

TASK ELEMENTS	Decisions		Go To Step	Tools, References, Work Aids
	Yes	No		
12. Determine extent of welding to be done			13	verbal, print, work order
13. Determine depth of fusion			14	
14. Determine size of weld			15	
15. Begin welding			16	
16. Are all of the welding variables correct?	17	25		
17. Is there a uniform bead structure forming?	18	26		
18. Complete weld			19	
19. Visually inspect weld			20	
20. Does the weld meet specifications?	21	27		
21. Turn off equipment			E.O.T.	
22. Read print			2	
23. Remove tack welds			24	
24. Realign joint			10	
25. Correct welding variables			17	
26. Correct welding technique			18	
27. Remove defective weld			28	
28. Reweld defective area			20	

APPENDIX A

PBVE

Welding Tool List

SAFETY GLASSES	135	90.6
GLOVES, LEATHER, PAIR	133	89.3
HELMET, WELDING ARC TYPE	131	87.9
GLOVES, WELDING	126	84.6
HAMMER, BALLPEEN	126	84.6
TIP CLEANERS	123	82.6
CUTTING TORCH, OXY-FUEL-PORTABLE	122	81.9
TOOL BOX	121	81.2
CLAMP, VISE GRIPS	121	81.2
CHANNEL LOCKS	120	80.5
CLAMP, C TYPE	120	80.5
SQUARE, FRAMING	119	79.9
AIR HOSE	119	79.9
CHISEL, COLD	117	78.5
SCREWDRIVERS, STANDARD BIT	117	78.5
BRUCH, WIRE	116	77.9
PLIERS, NEEDLE NOSE	116	77.9
PUNCH CENTER	116	77.9
GRINDER HAND	116	77.9
GRINDING, GOGGLES	116	77.9
STRAIGHT EDGE	115	77.2
SOAPSTONE	114	76.5
CYLINDER, ACETYLENE	114	76.5
FRAMING SQUARE	114	76.5
GOGGLES, OXY-FUEL CUTTING	113	75.8
WRENCHES, ALLEN	112	75.2
WORK BENCH	111	74.5
LEVEL	111	74.5
SCREWDRIVERS, PHILLIPS	111	74.5
SCRIBE	111	74.5
VISE	110	73.8
STRIKER	110	73.8
CYLINDER, OXYGEN	110	73.8
HAMMER, SLEDGE	110	73.8
SPARKLIGHTERS	109	73.2
CRAYONS, SOAPSTONE	108	72.5
GRINDER, -BENCH TYPE 1-2 HORSE MOTOR	107	71.8
HAMMER, CHIPPING	107	71.8
WELDER, AC DC	106	71.1
PLIERS, VISE GRIP WRENCH	106	71.1
WRENCH, OPEN END SET	105	70.5
AIR GRINDER	105	70.5
DRILL, ELECTRIC-3-8"	105	70.5
WRENCH, ADJUSTABLE END	104	69.8
WRENCH, SOCKET RATCHET	104	69.8
DRILL, ELECTRIC-1-2"	104	69.8
WELDING TORCH	103	69.1
REGULATOR, OXYGEN-2 STAGE	103	69.1
DRILL, PRESS	103	69.1
WRENCH, BOX SET	102	68.5
OXY-ACETYLENE CART, PORTABLE	102	68.5
SOCKETS	102	68.5
PLIERS, DIAGONAL CUTTING	101	67.8
WELDER, MIG	100	67.1
TIN SNIPS	100	67.1
FILES, FLAT BASTARD-DOUBLE CUT	100	67.1

CUTTER, WIRE	99	66.4
PRY BAR	99	66.4
SQUARE, COMBINATION	99	66.4
TORCH, CUTTING 90'-HAND	99	66.4
PLIERS, SLIP JOINT	98	65.8
GOGGLES, BRAZING	98	65.8
WRENCH, SOCKET 1-2 DRIVE	96	64.4
HYDRAULIC JACK	96	64.4
WRENCH, ALLEN KEY HEX SET	95	63.8
WRENCH, PIPE	95	63.8
RULE, FLEXIBLE STEEL TAPE 12'	95	63.8
WELDER, ARC AC	94	63.1
WRENCH, SOCKET 3-8" DRIVE	94	63.1
SAW, HACK-HAND	94	63.1
HOIST, OVERHEAD ON TRACK-ELECTRIC	94	63.1
JIGE AND FIXTURES	94	63.1
FILES, ROUND-SECOND CUT	93	62.4
PLIERS, STRAIGHT NOSE	92	61.7
VISE, BENCH	90	60.4
WRENCH, CYLINDER	90	60.4
AIR COMPRESSOR-STATIONARY	90	60.4
CHISELS	90	60.4
PLIERS, COMBINATION	89	59.7
TAPE MEASURE 12'	89	59.7
FUEL STRIKER, OXY	89	59.7
HOIST, 1 TON	89	59.7
CHAIN	88	59.1
COME ALONG	88	59.1
PUNCH	88	59.1
FILES, ROUND BASTARD	87	58.4
WRENCH, IMPACT	86	57.7
REGULATOR, ACETYLENE-2 STAGE	86	57.7
TAP & DYE SET	86	57.7
TAPE MEASURE 50'	85	57.0
WRENCH, COMBINATION	84	56.4
WRENCH, GAS TORCH	84	56.4
CUT OFF MACHINE, BAR & PIPE	84	56.4
SAW HORSES	84	56.4
DRILL, TWIST STRAIGHT SHANK	84	56.4
HELMET, GRIND FACE SHIELD	84	56.4
DRESSER, ABRASIVE WHEEL	83	55.7
DRILL, ELECTRIC-1-4"	82	55.0
AIR DRILL	81	54.4
RATCHETS	81	54.4
HAMMER, SOFT FACE	81	54.4
CHALK LINE	79	53.0
PROTRACTOR	77	51.7
SAW, ABRASIVE CUT OFF-ELECTRIC	77	51.7
GRINDER, PORTABLE	77	51.7
CUTTER, BOLT	76	51.0
FILES, MILL SMOOTH	76	51.0
EXTRACTOR SCREW SET	74	49.7
WELDER, AC DC WITH TIG	73	49.0
RULE, STEEL 12"	73	49.0
FILES, MILL	71	47.7
AIR SANDER	70	47.0

TRANSFORMER, RECTIFIED 300 AMP CV FOR Ml	70	47.0
HAMMER, BLACKSMITH	69	46.3
MALLET, PLASTIC	69	46.3
DIE NUMBER SET	68	45.6
RULE, FLEXIBLE STEEL TAPE 10'	68	45.6
WELDING TORCH, MEDIUM DUTY	66	44.3
DIE TAPPING	66	44.3
HEATING TIP, ROSEBUD TYPE	66	44.3
CUTTEN, PIPE	65	43.6
DRILL, TWIST NUMBER SET	65	43.6
GRINDER, PEDESTAL	65	43.6
AIR SAND BLASTER	64	43.0
BRUSH, BENCH	64	43.0
CLAMP, PIPE	64	43.0
PRESS	64	43.0
WELDER, TIG	63	42.3
IRON WORKING MACHINE	63	42.3
CHISEL, IMPACT	62	41.6
DRILL, TWIST FRACTIONAL SHANK	62	41.6
DIE LETTER SET	61	40.9
RULE, STEEL 6"	61	40.9
SANDER, VERTICAL BELT-ELECTRIC	61	40.9
SHEAR	61	40.9
WELD TIP #0, #1,#2,#3,#4,#5,#6+OTHERS	60	40.3
ANVIL; 100 1B.	60	40.3
BAND SAW-VERTICAL	60	40.3
HOIST, 1-2 TON	60	40.3
MALLET, RUBBER	60	40.3
AIR GUN	58	38.9
NIBBLER	58	38.9
RIVET GUN	57	38.3
MALLET, RAWHIDE	57	38.3
DRILL, HAND	56	37.6
CALIPER, INSIDE	55	36.9
CALIPER, OUTSIDE	55	36.9
MICROMETER	54	36.2
CRANE, OVERHEAD-10 TON	53	35.6
WELDING HOSE FOOTAGE 3-16"	52	34.9
WELDING TIP-ORAFICE	52	34.9
CHECK VALUE AT TORCH-REVERSE FLOW	52	34.9
CLAMP BAR, QUICK ACTING	52	34.9
WELDING LEATHERS	51	34.2
CRAYONS, HEAT	51	34.2
RECTIFIER, 300 AMP CC AC-DC 10' GRD, 15'	51	34.2
DRILL, TWIST LETTER SET	50	33.6
AIR HAMMER	49	32.9
FILE CARD AND BRUSH	49	32.9
RULE, CIRCUMFERENCE-36"	49	32.9
TRANSFORMER, RECTIFIED 400 AMP CC AC-DC	49	32.9
CENTER GAUGE	48	32.2
REAMER, PIPE	48	32.2
HYDRAULIC PUNCH	48	32.2
SHUT-OFF VALVE, OXYGEN-ACETYLENE-IN LINE	47	31.5
TONGS, PICK UP	47	31.5
BOX AND PAN BREAK	45	30.2
FILES, 3 SQ. 2ND CUT	45	30.2
GAUGE, FILLET	45	30.2
RULE, STEEL 24"	44	29.5

HOSE REPAIR KIT	44	29.5
METAL BLUING	44	29.5
POWER SHEAR	44	29.5
BUFFER, MACHINE	43	28.9
DRILL, STAND-FRACTIONAL	43	28.9
TRAMMEL POINTS	43	28.9
PRESS BRAKE	43	28.9
CUTTING MACHINE, STRAIGHT LINE FLAME	42	28.2
GLOVES, ASBESTOS, PAIR	42	28.2
NUT DRIVERS	42	28.2
FEEDER UNIT, FLUX CORED WIRE-W-400 AMP CV	41	27.5
GRINDER, STAND	41	27.5
VISE PIPE	40	26.8
REGULATOR, MANIFOLD-ACETYLENE	39	26.2
SAW, HACK-POWER	39	26.2
HARD HAT	39	26.2
POWER ROLL	39	26.2
BURNER, TRACK-ELECTRIC	38	25.5
V BLOCK AND CLAMPS SET	38	25.5
GRINDER, ELECTRIC-PEDESTAL TYPE 1 HORSE	38	25.5
HYDRAULIC SHEAR	38	25.5
GRINDER, SURFACE	38	25.5
AIR CHIPPER	37	24.8
VISE, BENCH DRILL	37	24.8
LATHE, ENGINE	37	24.8
WELDER, SPOT	36	24.2
AIR FIXTURE	35	23.5
SAW, BAND-HORIZONTAL	35	23.5
TOWMOTOR-CLARK-WHITE	35	23.5
WELDER, FLUX CORED	35	23.5
TONGS, BLACKSMITH CURVED LIPS	34	22.8
PENCIL, GRINDER	34	22.8
PUNCH DRIVER	34	22.8
AIR COMPRESSOR-PORTABLE	33	22.1
SHEAR, HAND SHEET METAL 1.D. #1 - 40	33	22.1
NIBBLER, ELECTRIC-16 GAL. CAPACITY SHEET	33	22.1
HAMMER, ELECTRIC	32	21.5
HEAT TREATING OVEN	32	21.5
SAW, BAND-POWER	31	20.8
WELDER, SPOT-RESISTANCE	31	20.8
PARALLELS, ADJUSTABLE	31	20.8
AWL	30	20.1
CLAMP, SQUARE THROAT	30	20.1
SHEAR, NIBBLER-PORTABLE	29	19.5
AIR SCALER	28	18.8
WIRE FEED UNIT, FLUX CORED, W-400 AMP CV	28	18.8
MILL, VERTICAL-DO ALL	28	18.8
CENTER HEAD	27	18.1
CYLINDER, PROPANE	27	18.1
CLAMP, QUICK RELEASE CHAIN	27	18.1
SANDER, FLEX FLAP WHEEL, ABRASIVE 3-4 HO	27	18.1
HARDNESS TESTER	25	16.8
HYDRAULIC PIPE BENDER	25	16.8
BAND SAW BLADE WELDER	24	16.1
GLOVES, RUBBER, PAIR	24	16.1

VISE, PIN SET	23	15.4
WINCH HOIST	23	15.4
MANIFOLD, STATION VALVE	23	15.4
QUENCHING TANK	23	15.4
HYDRAULIC PULLER	22	14.8
PRESS FORM-10 GAL. CAP.	22	14.8
OVEN ELECTRODE AND FLUX HOLDING	22	14.8
MANIFOLD, ACETYLENE-3 ON, 3 OFF	22	14.8
BRUCH, BENCH-ELECTRIC, ONE-HORSE MTR	21	14.1
DC POWER SOURCE, MOTOR DRIVEN-GASOLINE	21	14.1
BURNER, PANOGRAPHIC CONTOUR	21	14.1
TRUCK WELDING CYLINDER	21	14.1
MAGNA-FLUX MACHINE	21	14.1
BRAZING, FLUXER UNIT	19	12.8
TRANSFORMER, 250 AMP CC AC 10' GRD 15' L	19	12.8
SANDER, MACHINE	18	12.1
CUTTING HEAD, AUTOMATIC	17	11.4
CUTTING, RADIOGRAPH OXY-FUEL	17	11.4
WELDER, PROJECTION-RESISTANCE	17	11.4
RULE, HOOK	17	11.4
CLAMP, I BAR-6 FT.	16	10.7
SHEAR, 12 GA CAPACITY-8' CUT	16	10.7
WELDER, BUTT-RESISTANCE	16	10.7
SPRAY OUTFIT, EUTALLOY-ELECTRIC	16	10.7
ROTARY, WELD POSITIONS-ELECTRIC	16	10.7
CYLINDER, MAPP GAS	15	10.1
WELDER, SUBMERGED ARC	15	10.1
OTHER	15	10.1
HYDRAULIC HOIST FIXTURES	14	9.4
METAL IDENTIFICATION KITS	14	9.4
MANIFORD, OXYGEN-4 ON, 4 OFF	14	9.4
GENERATOR, 500 AMP. CC-DC 10' GRD 25' LE	13	8.7
TRANSFORMER, 1500 AMP AC CC WITH 1-2" CA	13	8.7
SLIP ROLL FORMER	11	7.4
PLASMA ARC CUTTER	11	7.4
PIPE BEVELING MACHINE	11	7.4
TENSILE TESTING MACHINE	10	6.7
METAL WORKERS-MULTI METAL WORKING TOOL	10	6.7
FLASH BACK ARRESTOR-HYDRAULIC	9	6.0
SHEAR, ALLIGATOR JAW	9	6.0
VISE, ANHEL DRILL	9	6.0
SHEAR, SLITTING	9	6.0
GENERATOR, 400 AMP. CONSTANT VOLTAGE-DV-D	8	5.4
GUIDED BEND TESTER	8	5.4
VOLTAGE MACHINE, CONSTANT FOR MTG	8	5.4
MIXING CHAMBER	8	5.4
GENERATOR, 400 AMP. CONSTANT CURRENT-CC	7	4.7
PIPE WRAP AROUND	7	4.7
RULE, SHORT SET	7	4.7
PUMP, ELECTRIC-3.5 G.P.M. AT 50 PSI	7	4.7
BLOWER FOR GAS HEATER-ELECTRIC	5	3.4
NIPPER, END CUTTING	5	3.4
PLASMA CUTTING UNIT	5	3.4
TRANSFORMER, RECTIFIED 180 AMP CV W-RUNN	4	2.7
WELDER, MAPP GAS	4	2.7
PIPE BEVELING MACHINE-ELECTRIC DRIVE	4	2.7
BRAZING, FURNACE	3	2.0

HYDRAULIC C CLAMP	3	2.0
AIR CYLINDERS	3	2.0
SHEAR, SQUARE FEET	3	2.0
METALLOGRAPHIC, POLISHER	2	1.3
PLANER, MACHINE-AT LEAST 12 STROKES	2	1.3
WELDER CLEANER, BENIE	1	0.7
WELD SHAVER	1	0.7

APPENDIX B

PBVE

Welding Project Task List

CHECK WELDING EQUIPMENT TO BE USED	127	85.2
CHECK WELD JOINT PREPARATION	120	80.5
CHECK JOINT FIT UP	114	76.5
VERIFY WELDING PROCEDURE	107	71.8
CHECK AND IDENTIFY MATERIALS	95	63.8
G.M.A.W. MILD STEEL TEE JOINT	91	61.1
G.M.A.W. MILD STEEL EDGE JOINT	90	60.4
G.M.A.W. MILD STEEL BUTT JOINT	90	60.4
G.M.A.W. MILD STEEL CORNER JOINT	90	60.4
G.M.A.W. MILD STEEL LAP JOINT	89	59.7
G.M.A.W. MILD STEEL PLUG HOLES	88	59.1
CUT METAL WITH OXY-FUEL HAND TORCH	86	57.7
DRILL METAL WITH DRILL PRESS	82	55.0
FABRICATE PART TO BLUEPRINT SPECIFICATION	80	53.7
CUT METAL WITH SHEAR	77	51.7
MARK WHERE METAL IS TO BE CUT	76	51.0
MARK METAL WHERE HOLE IS TO BE DRILLED	75	50.3
MARK METAL WHERE IS TO BE BENT	75	50.3
CUT METAL WITH ABRASIVE CUT OFF SAW	74	49.7
FABRICATE FIXTURE TO HOLD PART ID#6 1-60	72	48.3
MARK WHERE METAL PARTS ARE TO JOINT	72	48.3
VERIFY THE QUALIFICATIONS OF THE WELDER	70	47.0
SET-UP-CUT AND TRIM STRUCTURAL PARTS TO	67	45.0
G.T.A.W. STAINLESS STEEL BUTT JOINT	66	44.3
INSPECT RAW MATERIAL FOR QUALITY	64	43.0
G.T.A.W. STAINLESS STEEL TEE JOINT	63	42.3
G.T.A.W. STAINLESS STEEL CORNER JOINT	63	42.3
PUNCH METAL WITH PUNCH PRESS	60	40.3
FORM METAL WITH BRAKE PRESS	58	38.9
G.T.A.W. ALUMINUM EDGE JOINT	57	38.3
G.T.A.W. ALUMINUM LAP JOINT	57	38.3
G.T.A.W. ALUMINUM CORNER JOINT	57	38.3
CUT METAL WITH POWER HACK SAW	57	38.3
G.T.A.W. STAINLESS STEEL LAP JOINT	56	37.6
G.T.A.W. ALUMINUM TEE JOINT	56	37.6
CUT METAL WITH BAND SAW	54	36.2
REMOVE DISTORTION IN WELDMENT USING HEAT	54	36.2
G.M.A.W. STAINLESS STEEL TEE JOINT	53	35.6
G.M.A.W. -FLUX CORE MILD STEEL TEE JOINT	53	35.6
G.T.A.W. ALUMINUM BUTT JOINT	53	35.6
INSPECT PRE-MADE PART TO CONFORM TO SPEC	53	35.6
G.T.A.W. MILD STEEL EDGE JOINT	52	34.9
OXY-FUEL CUT WORN OR DAMAGED PIECES FROM	52	34.9
MAINTAIN RECORDS	51	34.2
G.T.A.W. MILD STEEL LAP JOINT	50	33.6
G.T.A.W. MILD STEEL TEE JOINT	50	33.6
G.M.A.W. STAINLESS STEEL EDGE JOINT	49	32.9
G.T.A.W. BUILD WORN SURFACE ALUMINUM	49	32.9
MARK WHERE SLOT IS TO BE MACHINED	49	32.9
FORGE METALS TO SHAPE USING HEAT	46	30.9
G.M.A.W. ALUMINUM TEE JOINT	45	30.2
G.M.A.W. ALUMINUM EDGE JOINT	45	30.2
G.M.A.W. ALUMINUM CORNER JOINT	45	30.2
CARBON ARC AIR-CUT METAL ON CARBON STEEL	44	29.5
G.M.A.W. ALUMINUM BUTT JOINT	44	29.5
G.M.A.W.-FLUX CORE MILD STEEL LAP JOINT	44	29.5

G.M.A.W. -FLUX CORE MILD STEEL EDGE JOINT	44	29.5
G.M.A.W. -FLUX CORE MILD STEEL CORNER JOINT	43	28.9
ARC AIR PREPARE EDGES FOR WELDING ON CAR	42	28.2
G.M.A.W. -FLUX CORE MILD STEEL BUTT JOINT	42	28.2
OXY-FUEL BRAZE CARBON STEEL TEE JOINT	41	27.5
OXY-FUEL BRAZE CARBON STEEL BUTT JOINT	41	27.5
G.M.A.W. -FLUX CORE MILD STEEL PLUG HOLES	41	27.5
COMPARE PURCHASE ORDER TO SPECIFICATION	41	27.5
SELECT PRODUCTION TEST SAMPLES	41	27.5
OXY-FUEL CUT SCRAP STRUCTURAL STEEL	41	27.5
OXY-FUEL BRAZE CARBON STEEL CORNER JOINT	40	26.8
G.M.A.W. STAINLESS STEEL CORNER JOINT	40	26.8
G.M.A.W. STAINLESS STEEL BUTT JOINT	40	26.8
G.T.A.W. AUTO ALUMINUM CORNER JOINT	40	26.8
REMOVE FATIGUED METAL WITH THE AIR CARBO	38	25.5
G.M.A.W. STAINLESS STEEL LAP JOINT	38	25.5
G.M.A.W. STAINLESS STEEL PLUG HOLES	38	25.5
G.T.A.W. MILD STEEL SPOT WELD	37	24.8
OXY-FUEL BRAZE CARBON STEEL LAP JOINT	36	24.2
INVENTORY PRE-MADE PART	36	24.2
SPOT WELD LAP JOINT STAINLESS STEEL	35	23.5
G.T.A.W. CARBON STEEL EDGE JOINT	35	23.5
G.T.A.W. CARBON STEEL CORNER JOINT	35	23.5
G.T.A.W. CARBON STEEL TEE JOINT	35	23.5
G.T.A.W. CARBON STEEL BUTT JOINT	35	23.5
OXY-FUEL WELD CAST IRON BUTT JOINT	35	23.5
SPOT WELD LAP JOINT MILD STEEL	34	22.8
G.T.A.W. AUTO ALUMINUM SPOT WELD	34	22.8
G.T.A.W. CARBON STEEL LAP JOINT	34	22.8
OXY-FUEL WELD CAST IRON CORNER JOINT	34	22.8
ARC AIR-PREPARE EDGES FOR WELDING ON ALL	33	22.1
OXY-FUEL WELD CAST IRON LAP JOINT	33	22.1
CARBON ARC AIR-BACKGOUGE-ON CARBON STEEL	32	21.5
G.M.A.W. ALUMINUM LAP JOINT	31	20.8
G.T.A.W. STAINLESS STEEL LAP JOINT	31	20.8
G.T.A.W. STAINLESS STEEL EDGE JOINT	31	20.8
SCRAF WITH HAND HELD TORCH	31	20.8
CARBON ARC AIR-BACKGOUGE-ON ALLOY STEEL	30	20.1
G.T.A.W. HARD FACE EDGES TOOL STEEL	30	20.1
G.T.A.W. STAINLESS STEEL CORNER JOINT	30	20.1
G.T.A.W. STAINLESS STEEL BUTT JOINT	30	20.1
INSPECT WELDS WITH DYE PENETRANTS	30	20.1
EVALUATE THE TEST RESULTS	29	19.5
CARBON ARC AIR-REMOVE INFERIOR WELD DEPO	28	18.8
G.T.A.W. TOOL STEEL TEE JOINT	28	18.8
G.T.A.W. TOOL STEEL LAP JOINT	28	18.8
CHECK WELDMENTS FOR CRACKS USING MAGNS-F	28	18.8
OXY-FUEL-TRACK CUT SHEET STOCKS	27	18.1
OXY-FUEL BRAZE CARBON STEEL EDGE JOINT	26	17.4
EBW STAINLESS STEEL LAP JOINT	26	17.4
EBW STAINLESS STEEL BUTT JOINT	26	17.4
G.M.A.W. ALUMINUM PLUG HOLES	26	17.4
CHECK METAL COMPOSITION AS SHOWN ON MILL	26	17.4
G.M.A.W.-FLUX CORE STAINLESS STEEL TEE JOINT	25	16.8
EBW STAINLESS STEEL TEE JOINT	24	16.1

EBW MILD STEEL BUT JOINT	24	16.1
G.T.A.W. STAINLESS STEEL SPOT WELD	24	16.1
CUT HOLES WITH ARC AIR TORCH CARBON STEEL	23	15.4
METAL WITH RADIO-GRAPH OXY-FUEL CUTTER	23	15.4
EBW MILD STEEL TEE JOINT	22	14.8
HARD FACE ALLOY STEEL WITH OXY-ACETYLENE	22	14.8
S.M.A.W. CARBON STEEL BUTT JOINT	21	14.1
S.M.A.W. CARBON STEEL EDGE JOINT	21	14.1
S.M.A.W. CARBON STEEL LAP JOINT	21	14.1
S.M.A.W. CARBON STEEL CORNER JOINT	21	14.1
S.M.A.W. CARBON STEEL TEE JOINT	21	14.1
CARBON ARC-PREPARE EDGES FOR WELDING ON	21	14.1
G.M.A.W. BUILD SURFACE ALLOY STEEL	21	14.1
EBW MILD STEEL LAP JOINT	21	14.1
G.M.A.W. GALVANIZED STEEL CARBON STEEL T	21	14.1
G.T.A.W. TOOL STEEL BUTT JOINT	21	14.1
G.T.A.W. TOOL STEEL CORNER JOINT	21	14.1
G.T.A.W. ALLOY STEEL BUILD SURFACE	21	14.1
HARD FACE SURFACE AREAS WITH THE EUTALLOY	21	14.1
G.T.A.W. CARBON STEEL HARDFACE	21	14.1
S.M.A.W. CARBON STEEL PLUG HOLES	20	13.4
G.M.A.W. BUILD WORN SURFACE ALLOY STEEL	20	13.4
G.M.A.W. GALVANIZED STEEL EDGE JOINT	20	13.4
G.M.A.W. GLAVANIZED CARBON STEEL CORNER	20	13.4
GALVANIZED CARBON STEEL LAP JOINT	20	13.4
G.M.A.W. GALVANIZED CARBON STEEL BUTT JOINT	20	13.4
G.T.A.W. ALLOY STEEL HARD FACE	20	13.4
BUILD WORN PARTS USING THE EUTALLOY SPRA	20	13.4
SPOT WELD LAP JOINT GALVANIZED STEEL	19	12.8
SEAM WELD LAP JOINT MILD STEEL	19	12.8
G.T.A.W. IRON HARD FACE	19	12.8
BUILD WORN AREAS ON CAST IRON WITH EUTAL	19	12.8
BUILD WORN SURFACES WITH THE EUTALLOY SP	19	12.8
HARD FACE AREAS ON CAST IRON WITH THE EU	19	12.8
OXY-FUEL BRAZE COPPER TEE JOINT	19	12.8
OXY-FUEL BRAZE COPPER BUTT JOINT	19	12.8
OXY-FUEL BRAZE COPPER LAP JOINT	19	12.8
SEAM WELD LAP JOINT ALLOY STEEL	17	11.4
BUILD UP EDGES ON TOOL STEEL WITH THE	17	11.4
BRAZE STEEL TO BRASS BUTT JOINT	17	11.4
BRAZE STEEL TO BRASS LAP JOINT	17	11.4
OXY-FUEL BRAZE COPPER CORNER JOINT	17	11.4
COPPER ALLOY BRAZE CAST IRON CORNER JOINT	17	11.4
SOLDER GALVANIZED SHEET EDGE JOINT	17	11.4
SOLDER GALVANIZED SHEET CORNER JOINT	17	11.4
SOLDER GALVANIZED SHEET LAP JOINT	17	11.4
SOLDER GALVANIZED SHEET TEE JOINT	17	11.4
G.M.A.W. BUILD UP WORN PARTS HARD SURFACE	16	10.7
G.M.A.W. BUILDING WORN SURFACE ALUMINUM	16	10.7
G.M.A.W. CAST IRON BUTT JOINT	16	10.7
SOLDER COPPER LAP JOINT	16	10.7
SOLDER COPPER CORNER JOINT	16	10.7
SOLDER COPPER EDGE JOINT	16	10.7
SOLDER COPPER TEE JOINT	16	10.7
CARBON ARC AIR-CUT METAL TO SPECIFICATION	15	10.1
HARD FACE ALLOY STEEL WITH OXY-ACETYLENE	15	10.1

BUILD SURFACE OF ALLOY STEEL TO SIZE WIT	15	10.1
OXY-ACETYLENE HARD SURFACING ON CAST IRON	15	10.1
G.M.A.W. HARD SURFACE STEEL	14	9.4
G.M.A.W. -FLUX CORE STAINLESS STEEL EDGE	14	9.4
G.M.A.W. HARD SURFACE STEEL	14	9.4
G.M.A.W. -FLUX CORE STAINLESS STEEL CORNER	14	9.4
G.M.A.W. -FLUX CORE STAINLESS STEEL BUTT	14	9.4
G.M.A.W. -FLUX CORE STAINLESS STEEL LAP JOINT	14	9.4
SILVER BRAZE TUNGSTEN CARBIDE LAP JOINT	14	9.4
SILVER BRAZE TUNGSTEN CARBIDE BUTT JOINT	14	9.4
S.M.A.W. HARD SURFACE CARBON STEEL	13	8.7
SPOT WELD LAP JOINT ALUMINUM	13	8.7
EBW MANAGESE STEEL LAP JOINT	13	8.7
G.M.A.W. CAST IRON HARD SURFACE	13	8.7
EBW MANAGESE STEEL TEE JOINT	13	8.7
EBW NICKLE BUTT JOINT	13	8.7
EBW MANAGESE STEEL BUTT JOINT	13	8.7
BRAZE COPPER TO STEEL LAP JOINT	13	8.7
COPPER ALLOY BRAZE CAST IRON TEE JOINT	13	8.7
SILVER BRAZE TUNGSTEN CARBIDE EDGE JOINT	13	8.7
SILVER BRAZE TUNGSTEN CARBIDE TEE JOINT	13	8.7
COPPER ALLOY BRAZE CAST IRON LAP JOINT	13	8.7
SILVER BRAZE TUNGSTEN CARBIDE CORNER JOINT	13	8.7
COPPER ALLOY BRAZE CAST IRON BUTT JOINT	13	8.7
S.M.A.W. PREPARE BASE METAL WITH CHAMFER	12	8.1
S.M.A.W. CUT METAL CUTTING ROD	12	8.1
S.M.A.W. CUTTING STAINLESS SHEET	12	8.1
CARBON ARC AIR-AND BACKGOUGE-ON CAST IRON	12	8.1
EBW NICKLE TEE JOINT	12	8.1
G.M.A.W. HARDFACE ALLOY STEEL	12	8.1
EBW NICKLE LAP JOINT	12	8.1
G.T.A.W. -SILICON BRONZE COPPER ALLOYS BU	12	8.1
G.T.A.W. CAST IRON TEE JOINT	12	8.1
G.T.A.W. CAST IRON LAP JOINT	12	8.1
BRAZE COPPER TO STEEL TEE JOINT	12	8.1
BRAZE COPPER TO STEEL BUTT JOINT	12	8.1
G.T.A.W. CAST IRON CORNER JOINT	12	8.1
G.T.A.W. CAST IRON BUTT JOINT	12	8.1
OTHER	12	8.1
COPPER ALLOY BRAZE COPPER ALLOY CORNER JOINT	12	8.1
COPPER ALLOY BRAZE COPPER ALLOY TEE JOINT	12	8.1
COPPER ALLOY BRAZE COPPER ALLOY LAP JOINT	12	8.1
COPPER ALLOY BRAZE COPPER ALLOY BUTT JOINT	12	8.1
SILVER BRAZE COPPER EDGE JOINT	12	8.1
SILVER BRAZE COPPER BUTT JOINT	12	8.1
SILVER BRAZE COPPER LAP JOINT	12	8.1
COPPER ALLOY BRAZE COPPER ALLOY EDGE JOINT	12	8.1
SILVER BRAZE COPPER TEE JOINT	12	8.1
SILVER BRAZE COPPER CORNER JOINT	12	8.1
S.M.A.W. CAST IRON BUTT JOINT	11	7.4
S.M.A.W. WORN SURFACE BEFORE APPLYING HA	11	7.4
CARBON ARC AIR-REMOVE EXCESSIVE CAST ALL	11	7.4
G.M.A.N. BUILD UP WORN PARTS BEFORE APPL	11	7.4
G.M.A.W. CAST IRON CORNER JOINT	11	7.4
G.T.A.W. -SILICON BRONZE COPPER ALLOYS LA	11	7.4
G.T.A.W. COPPER TEE JOINT	11	7.4

FUSION WELD COPPER ALLOYS LAP JOINT	11	7.4
FUSION WELD COPPER ALLOYS TEE JOINT	11	7.4
FUSION WELD COPPER ALLOYS CORNER JOINT	11	7.4
FUSION WELD COPPER ALLOYS EDGE JOINT	11	7.4
FUSION WELD COPPER ALLOYS BUTT JOINT	11	7.4
G.T.A.W. CORNER JOINT	11	7.4
G.T.A.W. COPPER EDGE JOINT	11	7.4
G.T.A.W. COPPER BUTT JOINT	11	7.4
G.T.A.W. COPPER LAP JOINT	11	7.4
S.M.A.W. -SILICON BRONZE CARBON ARC-CARBO	10	6.7
G.M.A.W. HARDFACE EDGES TOOL STEEL	10	6.7
G.M.A.W. BUILD WORN SURFACE ALUMINUM ALL	10	6.7
G.M.A.W. HARD SURFACE CAST IRON	10	6.7
G.M.A.W. BUILD WORN SURFACE COPPER AND A	10	6.7
G.M.A.W. COPPER TEE JOINT	10	6.7
G.M.A.W. CAST IRON LAP JOINT	10	6.7
G.M.A.W. CAST IRON TEE JOINT	10	6.7
G.M.A.W. COPPER LAP JOINT	10	6.7
G.T.A.W. -SILICON BRONZE COPPER ALLOYS CO	10	6.7
G.T.A.W. -SILICON BRONZE COPPER ALLOYS TE	10	6.7
G.M.A.W. COPPER BUTT JOINT	10	6.7
G.M.A.W. COPPER CORNER JOINT	10	6.7
G.M.A.W. COPPER EDGE JOINT	10	6.7
G.T.A.W. MAGNESIUM BUTT JOINT	10	6.7
FUSION WELD CARBON STEEL CORNER JOINT	10	6.7
FUSION WELD CARBON STEEL EDGE JOINT	10	6.7
G.T.A.W. MAGNESIUM CORNER JOINT	10	6.7
FUSION WELD CARBON STEEL BUTT JOINT	10	6.7
G.T.A.W. MAGNESIUM TEE JOINT	10	6.7
S.M.A.W. -SILICON BRONZE, CARBON ARC GAL	9	6.0
S.M.A.W. -SILICON BRONZE, CARBON ARC- GA	9	6.0
S.M.A.W. -SILICON BRONZE, CARBON ARC- GA	9	6.0
S.M.A.W. -SILICON BRONZE, CARBON ARC- GA	9	6.0
CARBON ARC AIR-REMOVE EXCESSIVE CAST IRO	9	6.0
EBW ALUMINUM LAP JOINT	9	6.0
EBW ALUMINUM BUTT JOINT	9	6.0
SAMPLE WELD PARTS FOR WELD DEPTH	9	6.0
EBW ALUMINUM TEE JOINT	9	6.0
OTHER	9	6.0
FUSION WELD CARBON STEEL LAP JOINT	9	6.0
FUSION WELD CARBON STEEL TEE JOINT	9	6.0
S.M.A.W. STAINLESS STEEL EDGE JOINT	8	5.4
S.M.A.W. -SILICON BRONZE, CARBON ARC- GA	8	5.4
CARBON ARC AIR-CUT METAL TO SPECIFICATION	8	5.4
G.M.A.W. -SILICON BRONZE GALVANIZED STEEL	8	5.4
OTHER	8	5.4
COPPER ALLOY BRAZE CARBON STEEL EDGE JOINT	8	5.4
COPPER ALLOY BRAZE CARBON STEEL BUTT JOINT	8	5.4
COPPER ALLOY BRAZE CARBON STEEL LAP JOINT	8	5.4
S.M.A.W. -SILICON BRONZE, CARBON ARC-CA	8	5.4
S.M.A.W. -SILICON BRONZE CARBON ARC-CAR	8	5.4
S.M.A.W. -SILICON BRONZE CARBON ARC-CA	8	5.4
S.M.A.W. -SILICON BRONZE, CARBON ARC-CA	8	5.4
COPPER ALLOY BRAZE CARBON STEEL CORNER JOINT	8	5.4
S.M.A.W. STAINLESS STEEL LAP JOINT	8	5.4
PLASMA ARC CUT STAINLESS	7	4.7

G.M.A.W. WORN SURFACE COPPER AND ALLOYS	7	4.7
G.M.A.W. -SILICON BRONZE GALVANIZED STEEL	7	4.7
G.M.A.W. -SILICON BRONZE GALVANIZED STEEL	7	4.7
G.M.A.W. -SILICON BRONZE GALVANIZED STEEL	7	4.7
G.T.A.W. STAINLESS STEEL HARD-FACE	7	4.7
G.M.A.W. -SILICON BRONZE GALVANIZED STEEL	7	4.7
	7	4.7
COPPER ALLOY BRAZE CARBON STEEL TEE JOINT	7	4.7
S.M.A.W. STAINLESS STEEL BUTT JOINT	7	4.7
S.M.A.W. STAINLESS STEEL TEE JOINT	7	4.7
WELD ALLOY METAL CORNER JOINT	7	4.7
WELD ALLOY METAL LAP JOINT	7	4.7
WELD ALLOY METAL TEE JOINT	7	4.7
WELD ALLOY METAL BUTT JOINT	7	4.7
PLASMA ARC CUT ALUMINUM	6	4.0
CARBON ARC AIR-CUT METAL ON COPPER ALLOY	6	4.0
CARBON ARC AIR-REMOVE EXCESSIVE CAST STEEL	6	4.0
G.T.A.W. STAINLESS STEEL PIERCE HOLES	6	4.0
G.T.A.W. MAGNESIUM EDGE JOINT	6	4.0
CUT CAST IRON WITH OXY-FUEL EQUIPMENT	6	4.0
FUSION WELD ALLOY STEELS BUTT JOINT	6	4.0
OXY-FUEL GALVANIZED SHEET METAL BUTT JOINT	6	4.0
WELD MILD STEEL BUTT JOINT	6	4.0
OXY-FUEL GALVANIZED SHEET METAL LAP JOINT	6	4.0
S.M.A.W. STAINLESS STEEL CORNER JOINT	6	4.0
WELD MILD STEEL TEE JOINT	6	4.0
OXY-FUEL GALVANIZED SHEET METAL TEE JOINT	6	4.0
OXY-FUEL GALVANIZED SHEET METAL CORNER JOINT	6	4.0
FUSION WELD ALLOY STEELS EDGE JOINT	6	4.0
FUSION WELD ALLOY STEELS CORNER JOINT	6	4.0
FUSION WELD ALLOY STEELS TEE JOINT	6	4.0
FUSION WELD ALLOY STEELS LAP JOINT	6	4.0
CARBON ARC AIR-BACKGOUGE ON COPPER ALLOY	5	3.4
CARBON ARC AIR-REMOVE EXCESSIVE WHITE METAL	5	3.4
CARBON ARC AIR-EDGES FOR WELDING ON COPPER	5	3.4
CARBON ARC AIR-BACKGOUGE-ON WHITE METALS	5	3.4
OXY-FUEL WELD ALUMINUM LAP JOINT	5	3.4
WELD MILD STEEL CORNER JOINT	5	3.4
OTHER	5	3.4
OXY-FUEL WELD ALUMINUM CORNER JOINT	5	3.4
OXY-FUEL WELD ALUMINUM BUTT JOINT	5	3.4
OXY-FUEL WELD ALUMINUM TEE JOINT	5	3.4
OXY-FUEL WELD ALUMINUM EDGE JOINT	5	3.4
OXY-FUEL WELD ALUMINUM CORNER JOINT	5	3.4
PLASMA ARC CUT ALUMINUM	4	2.7
SEAM WELD LAP JOINT ALUMINUM	4	2.7
SET UP CARBON ARC AIR-CUT WHITE METAL TO	4	2.7
G.M.A.W. CORED WIRE STAINLESS STEEL SURF	4	2.7
CARBON ARC AIR-EDGE PREPARATION WHITE ME	4	2.7
BRAZE COPPER TO CAST IRON	4	2.7
BRAZE COPPER TO STAINLESS STEEL	4	2.7
PLASMA ARC CUT STEEL	3	2.0
MAKE EB MACHINE MAINTENANCE CHECKS	3	2.0
G.T.A.W. -SILICON BRONZE COPPER TO CAST I	3	2.0
G.T.A.W. MAGNESIUM LAP JOINT	3	2.0
BRAZE COPPER ON ALLOY STEEL LAP JOINT	3	2.0

BRAZE COPPER ON ALLOY STEEL TEE JOINT	3	2.0
BRAZE COPPER ON ALLOY STEEL CORNER JOINT	3	2.0
BRAZE COPPER ON ALLOY STEEL EDGE JOINT	3	2.0
BRAZE COPPER ON ALLOY STEEL BUTT JOINT	3	2.0
OXY-ACETYLENE HARD FACING ON COPPER AND	3	2.0
S.M.A.W. CAST IRON TEE JOINT	3	2.0
CAST IRON CORNER JOINT	3	2.0
ELECTRONIC GAS SURFACING STEEL	3	2.0
STRESS RELIEVE PARTS WITH EB MACHINE	2	1.3
G.T.A.W. -SILICON BRONZE STAINLESS TO COP	2	1.3
G.T.A.W. TITANIUM LAP JOINT	2	1.3
G.T.A.W. TITANIUM BUTT JOINT	2	1.3
BRAZE COPPER ON ALLOY STEEL BUTT JOINT	2	1.3
OTHER	2	1.3
S.M.A.W. HARD SURFACE CAST IRON	2	1.3
S.M.A.W. CAST IRON LAP JOINT	2	1.3
S.M.A.W. BUILD SURFACE ALLOY STEEL	2	1.3
PLASMA ARC CUT ALLOY STEEL	2	1.3
S.M.A.W. HARD FACE ALLOY STEEL	2	1.3
OTHER	1	0.7
OTHER	1	0.7
	1	0.7
OTHER	1	0.7
	1	0.7
	1	0.7
EBW COPPER BUTT JOINT	1	0.7
EBW COPPER TEE JOINT	1	0.7
EBW COPPER LAP JOINT	1	0.7
OTHER	1	0.7
G.M.A.W. CORED WIRE NICKEL ALLOYS TEE JOINT	1	0.7
G.T.A.W. COPPER EDGE JOINT	1	0.7
G.T.A.W. COPPER LAP JOINT	1	0.7
G.T.A.W. COPPER AND ALLOYS HARDFACE	1	0.7
G.T.A.W. COPPER BUTT JOINT	1	0.7
G.T.A.W. INCONEL SPOT WELD	1	0.7
G.T.A.W. INCONEL TEE JOINT	1	0.7
G.T.A.W. INCONEL BUTT JOINT	1	0.7
G.T.A.W. INCONEL LAP JOINT	1	0.7
G.T.A.W. INCONEL EDGE JOINT	1	0.7
G.T.A.W. COPPER CORNER JOINT	1	0.7
G.T.A.W. COPPER SPOT WELD	1	0.7
G.T.A.W. MAGNESIUM LAP JOINT	1	0.7
G.T.A.W. MAGNESIUM CORNER JOINT	1	0.7
G.T.A.W. MAGNESIUM EDGE JOINT	1	0.7
G.T.A.W. MAGNESIUM TEE JOINT	1	0.7
	1	0.7
	1	0.7
G.T.A.W. TITANIUM EDGE WELD	1	0.7
G.T.A.W, TITANIUM CORNER JOINT	1	0.7
OTHER	1	0.7
	1	0.7
G.M.A.W. CORED NICKEL ALLOYS SURFACING	1	0.7
G.M.A.W. CORED NICKEL ALLOYS CORNER JOINT	1	0.7
G.M.A.W. CORED WIRE NICKEL ALLOYS LAP JOINT	1	0.7
G.M.A.W. CORED WIRE NICKEL ALLOYS BUTT JOINT	1	0.7
OTHER	1	0.7

OTHER	1	0.7
	1	0.7
	1	0.7
OTHER	1	0.7
SAW HARD FACE CAST IRON	1	0.7
PLASMA ARC CUT CAST IRON	1	0.7
PLASMA ARC CUT COPPER	1	0.7
PLASMA ARC CUT COPPER AND ALLOY	1	0.7
OTHER	1	0.7
	1	0.7
OTHER	1	0.7
	1	0.7
	1	0.7
	1	0.7
	1	0.7
S.M.A.W. ALUMINUM ALLOYS CORNER JOINT	1	0.7
S.M.A.W. ALUMINUM ALLOYS TEE JOINT	1	0.7
S.M.A.W. ALUMINUM ALLOYS EDGE JOINT	1	0.7
S.M.A.W. ALUMINUM ALLOYS LAP JOINT	1	0.7
S.M.A.W. ALUMINUM ALLOYS BUTT JOINT	1	0.7
S.M.A.W. BUILD WORN SURFACES ALUMINUM	1	0.7
SAW BUILD SURFACE OF ALLOY STEEL	1	0.7
SAW BUILD UP CAST IRON	1	0.7
SAW HARD FACE ALLOY STEEL	1	0.7